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VETERINARY MEDICINE

JULY CONTENTS 1947

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No. 7

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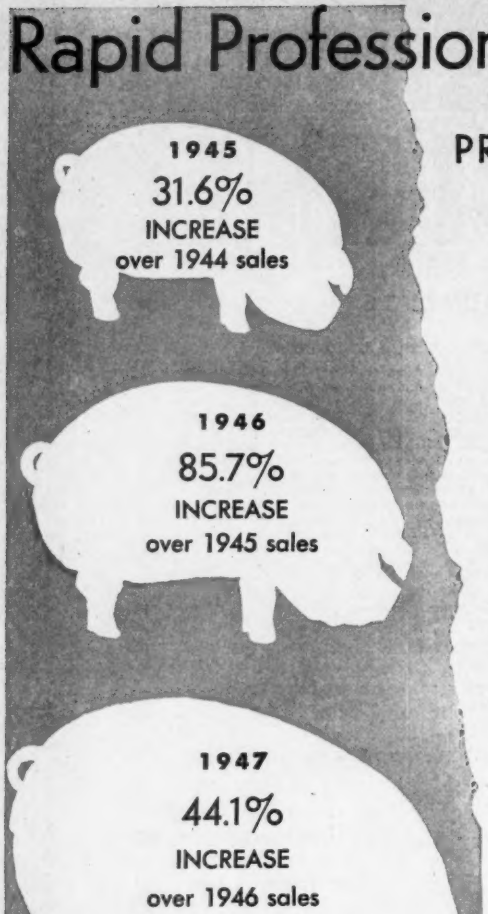

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The rabbit carries his life history on his pelt. After the pelt is dried an expert can tell how the rabbit was fed, where it lived, its age, its sex and its size at the time it was killed.—*S. L. Berlin,* Mgr. Rabbit Industries.

Tests at Michigan State College showed that removal of bones from meat prior to freezing and cooking does not impair the flavor. Advantages of bone removal are, packaging is easier and less damage to wrappers results in storage and there is a saving up to 35% of the frozen storage space.

The first sizable outbreak of Q fever in the United States occurred among livestock handlers and abattoir employees at Amarillo, Texas. There were 55 cases among 136 employees of three establishments—an attack rate of 40%. Q fever is typhus-like rickettsial infection caused by *Rickettsia burneti.* It was first discovered in Queensland, Australia, in 1935.

In an investigation at the Kansas experiment station to determine the effect of different methods of preliminary handling on the keeping quality of frozen poultry, it was shown that holding eviserated birds at chillroom temperature for one day or longer resulted in decidedly inferior acceptability after frozen storage of nine to 20 months. New York dressed birds frozen for two weeks, then thawed, eviserated and refrozen all within a period of four to five hours resulted in marked deterioration of quality after frozen storage for nine to 20 months. The deterioration in quality of the frozen, thawed and refrozen carcasses was almost equivalent to that in eviserated carcasses held in the chillroom six days.

Three of the most dangerous diseases of man are contracted mainly from domestic animals —rabies from dogs, psittacosis from parrots and encephalitis (Western equine encephalomyelitis) from horses.

Poultrymen have long believed that white chickens suffer more from lice than colored birds. In two experiments at the Kentucky experiment station, where both breeds were subjected to the same exposure in mixed flocks, White Leghorns acquired more than twice as many lice as Rhode Island Reds.

Small Stock Magazine hazards the statement that Germany would probably have been out of the war two years earlier had it not been for rabbits. Every German family was compelled to keep 10 does. Thus there was no meat famine in Germany even though there was little of the larger stock left.

S. F. Ravenel, M.D., reports amazingly rapid recoveries from Rocky Mountain spotted fever from the use of para-aminobenzoic acid, one of the B vitamins. "The astonishing thing about these patients was the amazing speed with which the temperature dropped, the rash faded and recovery ensued."

Penn reports that Salmonella organisms are more frequently isolated from the intestinal tract in cases of enteritis in mink than any other organism. The order of frequency of different species was: *S. typhisuis* 65%, *S. choleraesuis* 21%, *S. enteritidis* and *S. paratyphi* 14%. Until recently *S. typhisuis* was thought to occur only in swine (Kelser and Schoening) and had not been reported in this country.

Spraying nest boxes and roosts with 5% DDT in oil freed a poultry house of bedbugs for more than two months. Before spraying, 380 bugs, mostly nymphs, were counted in one nest box. Two months later not one bug, *Cimex lectularius* could be found in any nest box.

Het, hexaethyl tatraphosphate, is a new insecticide brought out of Germany. It has the property of killing some pests that are tolerant of DDT. It is very destructive to the cabbage aphid, for example, which is little affected by DDT, nicotine or rotenone. It has no residual effect, being decomposed rapidly.

Octa-Klor is the trade name of a new chlorinated hydrocarbon insecticide, sometimes referred to as "1068." The refined product is a viscous nearly odorless liquid, soluble in kerosene and in the usual organic solvents. It is said to exhibit a high order of toxicity to a wide range of insects and arthropods, including the flies, mosquitoes, ticks, fleas, lice and roaches. It has double the knock-down power of DDT and nearly as extended residual effect the manufacturer claims.

Dowklor = DDT × 10

Comes now "dowklor," chlorodane, 10 times as toxic as DDT—for certain insects. Like DDT the residual effect persists several months. Cockroaches which can live a week with DDT and which have never been controlled adequately by any pest eradicator are said to succumb promptly from a single application of chlorodane as do also ants, army worms, centipedes, spiders, beetles and other resistant species. Chlorodane is marketed in both liquid and powder form. Properly used it is harmless to mammalia.

Benzine Hexachloride (Gammexane)

Benzine hexachloride was discovered by Michael Farraday in 1825 but it was not until the late war that it was discovered to be the most potent insecticide known. It combines many of the values of arsenicals, nicotine and rotenone with those of most fumigants. In tests one part in a million parts of grain killed 100% of grain weevils. It has eight to nine times the killing power of DDT for flies and mosquitoes. It is 10 times as toxic for grasshoppers as sodium arsenite. It does not have the long residual effect of DDT, a disadvantage in fly and mosquito control in buildings but an advantage in orchard and vegetable sprays where its more rapid evaporation permits its general use without the danger of contaminating the edible products.

The New Surgeon General

Brig. Gen. Raymond E. Bliss, Deputy Surgeon General of the Army was promoted to Major General and appointed Surgeon General May 31, to succeed Maj. Gen. Norman T. Kirk whose four-year tour of duty as Surgeon General expired on that date. During the late war General Bliss made extensive tours of the European, Mediterranean and Pacific theaters of operations and was an observer at the atom bomb test at Bikini.

A Century of Achievement

Forty medical societies and 28 colleges were represented by the 250 delegates who founded the American Medical Association in Philadelphia May 5, 1847. This year more than 15,000 physicians, representatives from the United States and foreign countries, attended the Centennial Session of the organization at Atlantic City, June 9-13, 1947, to celebrate the "Century of Progress"—so designated by the Boston Post.

Of the 190,000 doctors of medicine in the United States, 131,590 are now members of the medical group organized just 100 years ago.

A stamp, 3 cent denomination, commemorative of the founding of the American Medical Association was placed on sale by the U. S. Post Office Dept. June 9, the opening day of the Centennial Meeting.

Infectious Equine Encephalomyelitis

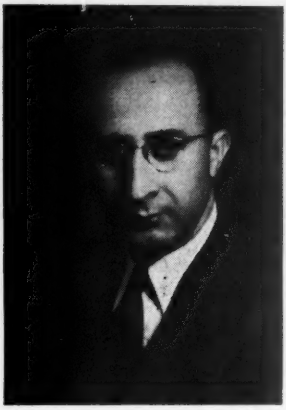
Infectious equine encephalomyelitis was reported from 37 states during 1946, but only 2,805 cases were recorded. This is slightly lower than the 3,212 of 1945, and is the lowest number for any of the preceding 12 years.

The general pattern of distribution of the disease remained about the same as in former years except for lower incidence. The average mortality for 1946 (34%), as in 1945 (36%), was higher than in other years. The peak months of occurrence were June, July, August, September and October. More cases occurred in September than in any other month.

It is estimated, on the basis of production and other records that about 400,000 animals were vaccinated (two doses) in 1946. Twenty-six animals were reported to have contracted the disease despite vaccination, nine of which died of equine encephalomyelitis. Only about one-eighth of the vaccinations reported were accomplished before the disease became epizootic. Kansas (421 cases), Oklahoma (355 cases), Iowa (178 cases), North Dakota (174 cases) and Idaho (187 cases) headed the list of states in the number of cases.—*Rept. of the Chief of the Bureau of Animal Industry, USDA.*

New Veterinary Dean at Michigan State College

As announced earlier[1] Dean Ward Giltner of the Division of Veterinary Science, Michigan State College will begin one year of leave



C. S. Bryan

of absence July 1, prior to retirement June 30, 1948. Dr. C. S. Bryan has been elected to the position of acting dean during the period of Dean Giltner's leave.

Claude S. Bryan was born June 5, 1908, at Bedminster, Pa., of Dutch ancestry. He was graduated from the Pennsylvania State College in 1930 and in the same year joined the Michigan faculty as a half-time, graduate assistant. He held various positions in the department of bacteriology of the college and on the experiment station staff to that of Research Professor of Bacteriology and Public Health. In 1944 he transferred to the veterinary school to become Professor of Surgery and Medicine and Head of the Department and, as stated, July 1st, he will become Acting Dean.

Doctor Bryan has received the following degrees from Michigan State College: M.S., 1932; Ph.D., 1937 and D.V.M., 1942. He is the author of one book, Dairy Bacteriology and Public Health and is author or co-author of several chapters of Bovine Mastitis by Little and Plastridge. He has published more than 100 articles in various scientific periodicals and has repeatedly appeared on the programs of state veterinary associations in surrounding and more distant states. His research on the therapy of mastitis, during recent years, has been outstanding and has contributed largely to the sum of our knowledge on that subject.

During the war he appeared before each class of the Army School of Meat and Dairy Hygiene, Chicago, as guest lecturer on milk and dairy hygiene.

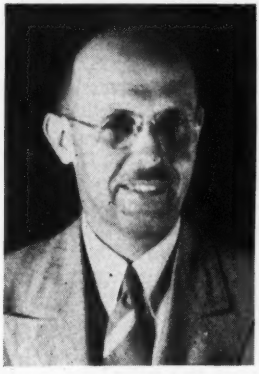
[1] *Vet. Med.*, March, 1947, page 86.

Operation Observed Through Television

Three hundred doctors and medical students at the Johns Hopkins Hospital, Baltimore, watched on television screens as surgeons performed an operation. The experiment is regarded as a new and effective method of surgical education. Two television cameras were used, one mounted over the operating table itself and the other, equipped with a telephoto lens, in the gallery of the operating theatre. The surgeon performing the operation gave a running commentary through a microphone mounted above the table. Ten receivers were placed in other parts of the hospital and the students could watch the operation closely "without crowding round the patient." Dr. Edwin Crosby, the director of the hospital, commented: "Television has brought the operative field within the critical sight of large numbers of doctors and students and will permit them to witness many operations."—*British Med. J.*

Stafseth Succeeds Giltner in Bacteriology

Dr. H. J. Stafseth, Professor of Pathogenic Bacteriology, Michigan State College, will be-



H. J. Stafseth

come acting head of the Department of Bacteriology; vice Dean Giltner who begins a year's leave of absence on that date. Doctor Stafseth returned from China recently where he had spent a year as veterinary advisor to the Chinese Department of Agriculture. He was in large measure responsible for establishing a college of veterinary medicine in Lanchow University, where students were enrolled last November for a four-year course, and for inaugurating a national veterinary service in China, including laboratories for the production and distribution of biological products, which should develop along the lines of the Bureau of Animal Industry, USDA.

Goss Retires from O.S.U.

After having taught veterinary pathology for more than 40 years Dr. Leonard W. Goss, Professor of Veterinary Pathology in the College of Veterinary Medicine, Ohio State University,

Leonard W. Goss

will retire at the end of the current academic year.

Doctor Goss was born at Edinburg, Ohio, April 26, 1877. He married Miss Florence Joyce Sept. 8, 1909. They have three children one of whom, Leonard J., is veterinarian to the New York Zoological Society. The two daughters, both married, live in Columbus.

Doctor Goss was graduated from O.S.U. in 1905 with the degree of D.V.M. He attended the University of Chicago in the summer 1906 and the Veterinary College in Berlin in 1911-12. He served on the faculty of the Division of Veterinary Medicine, Kansas State College 1905-19 in grades from Assistant to Professor of Pathology and at Ohio State University since 1920. In addition to 40 classes of undergraduates that he has instructed, 32 men have received M.S. degrees and one a Ph.D. degree under his supervision.

Always an enthusiastic organization supporter, Doctor Goss has served on many committees in the A.V.M.A., the Ohio V.M.A., Kansas V.M.A., U. S. Livestock Sanitary Association, American Association of Pathologists, Conference of Research Workers, etc.

* * * *

Approximately 36% of the veterinarians in the United States have contributed to the $100,000 fund the A.V.M.A. set out to raise to support graduate study, by young veterinarians with a liking for research. By contributing more than the average allotment, these individuals have raised approximately 70% of the total amount set as the goal. The veterinarians in several states and the District of Columbia and Hawaii exceeded their quota. A greater number including some states ranking near the top of the list in veterinary population, are lagging in contributions. The type of state association that a state has, appears to be the chief factor in determining its standing in the list of contributors.

Veterinary Corps Officers Recently Retired

Brower, George W., Col. Born: 10/26/86; KCVC '13; appointed V. C., 12/4/17; retired, 6/30/46.

Cook, Chauncey E., Col. Born: 12/10/89; OSU '09; appointed V. C., 6/28/17; retired, 11/30/46.

Cox, Claude F., Col. Born: 5/8/92; CVC '13; appointed V. C., 6/28/18; retired, 11/30/46.

Getz, Austin T., Lt. Col. Born: 9/16/'06; ISC '30; appointed V. C., 7/22/30; retired, 10/31/46.

Greenlee, Christian W., Col. Born: 8/8/86; OCU '11; appointed V. C., 9/24/17; retired, 11/30/46.

Hill, Verne C., Lt. Col. Born: 12/8/98; KSC '24; appointed V. C., 8/25/25; retired, 1/31/47.

Kielsmeier, Samuel G., Col. Born: 2/22/93; CVC '16; appointed V. C., 9/12/17; retired, 10/31/46.

Kintner, John H., Col. Born: 9/13/91; UP '17; appointed V. C., 9/21/17; retired, 11/2/46.

Pickering, Clifford E., Col. Born: 9/22/88; WSC '09; appointed V. C., 3/20/18; retired, 9/30/46.

Reynolds, Francois H. K., Col. Born: 4/13/96; Geo. Wash '14; appointed V. C., 9/23/18; retired, 9/30/46.

Rife, George J., Col. Born: 11/14/87; KCVC '16; appointed V. C., 7/18/17; retired, 8/31/46.

Robertson, Daniel S., Col. Born: 9/29/91; KCVC '16; appointed V. C., 9/28/17; retired, 10/31/46.

Underwood, Jean R., Col. Born: 9/14/87; ISC '09; appointed V. C., 3/15/18; retired, 11/30/46.

* * * *

At the 40th annual meeting of the American Pharmaceutical Manufacturers Association at Boca Raton, Florida, April 28-30, 1947, Dr. Bernardo Alberto Houssay, an honorary professor on the Veterinary Faculty of the University of the La Plata, Buenos Aires, received the Association's annual award "in recognition and appreciation of his illustrious contribution to medical science." The presentation speech was made by Dr. Anton J. Carlson of Chicago. The chairman of the Research Board of the Association in introducing Doctor Carlson referred to him and Doctor Houssay as the "world's two greatest living physiologists." Doctor Carlson spoke of the award winner as the scientific beacon at Buenos Aires which guides and cheers many workers on the scientific frontiers of biology and medicine in every land."

Dogs Suspected of Having Rabies

The sanitary code of every modern health department contains provisions for the disposal of unowned, vicious and rabid dogs and for the confinement of animals to prevent the spread of rabies. No effort should be spared by the local health authorities to apprehend alive the dog that has bitten a person; it must be held under observation in a properly constructed kennel for a period of not less than two to three weeks. Even if the dog appears to have contracted rabies it should not be killed, since it is often impossible to demonstrate the characteristic Negri bodies in the brain of an animal prematurely killed in the early stages of the infection. If during the observation period the dog fails to show symptoms or to die, it is obviously unnecessary to begin vaccine treatment.—KARL F. MEYER, in *J. Am. Med. Assn.*, Mar. 22, 1947, p. 832.

Improvement of the Solution of Calcium Borogluconate for Subcutaneous Injection

The authors show that solutions of sodium-calcium borogluconate of a pH about 7.2, being adapted to that of the subcutaneous tissue, causes less pain and a slighter local reaction than does the acid solution. The pH of the latter is in the region of 4 and so differs considerably from that of the subcutis.

They give a simple method of preparing the improved solution which has been used in the clinics of the Veterinary Faculty of Utrecht on about 60 animals and never caused reason for any complaint.

Take 62gm of calcium gluconate with 12gm of boric acid and boil in 300cc of distilled water until clear. This takes 10 minutes. Allow the solution to cool, then add 14gm of sodium bicarbonate and boil until development of CO_2 is finished. Allow to cool, then add distilled water up to 400cc. Then filter through a hard filter.

It is claimed that the pH of the resulting solution always lies in the immediate proximity of the neutral point, *i.e.*, pH 7.

Finally, the liquid is sterilized by heating filled bottles in a water bath for one hour at 100° C.

It is recommended that this process be repeated the next day.

It appears that on account of the solution being heated for a long time in bottles of ordinary glass the pH rises 0.1 to 0.2. The pH of the liquid injected therefore ranges 7.2 to 7.3. —*L. Seekles* and *E. Havings* in *Norsk Veterinaer-Tidsskrift.*—Reprinted from *The Veterinary Journal*, 103:2, pp. 69-70. 1947.

In my personal observation the longest incubation period in rabies has been 367 days.—KARL F. MEYER.

Rabies Cases Increased in 1946

Based on data assembled from state authorities, the Bureau of Animal Industry, USDA, announced that reported cases of rabies for the calendar year of 1946 totaled 10,872. This was the largest number to be reported in any calendar year in a decade, and it included 22 cases in persons, 8,384 in dogs, 982 in cattle, 789 in foxes, 44 in horses, 15 in sheep, 22 in swine, 455 in cats, 12 in goats and 167 miscellaneous cases, including mules, coyotes, skunks and chickens. The Bureau's report lists the cases in both animals and persons as reported by states.

Vitamin C in Traumatic Shock

The experience of several physicians and dentists in use of ascorbic acid to allay traumatic shock is the basis of a report by H. N. Holmes *(Ohio State M.J.*, 42:1261, 1946).

Traumatic shock, whatever the cause, is accompanied by decrease in blood volume and pressure. Increased capillary permeability, an important feature of the shock picture, results in loss of blood plasma into surrounding tissues. A low level of ascorbic acid may be a cause of increased capillary permeability.

In minor surgery of teeth extraction, oral administration of 500mg of ascorbic acid within the hour before operation was "remarkably successful" in preventing shock and postoperative weakness. These results in dentistry seemed to justify further tests in major surgery.

In battle, auto accidents, in home or factory accidents there may be dangerous delay before adequate medical attention is received. Immediate administration of 500mg or more of ascorbic acid to 35 accident cases at a coal mine seemed to increase shock resistance and improve the condition of patients on hospitalization.

Intravenous administration of 500 to 1000mg of ascorbic acid in sterile, buffered solutions was used preoperatively and postoperatively in a series of 50 major abdominal operations with reported shorter recovery and convalescence and with fewer complications.

The peak blood level of vitamin C in 20 healthy persons after oral intake of 500 to 1000mg of ascorbic acid was generally observed in two or three hours, rarely in one hour. After six hours, the level was still higher than the initial level. With intravenous injections peak levels were reached in three to five minutes.—*Therapeutic Notes*, 54:3, p. 71. 1947.

New USDA Yearbook, 1943-47

The new Yearbook of Agriculture 1943-1947, which answers thousands of questions about recent developments in farming, gardening, and homemaking, is now ready for distribution.

Copies can be obtained at a cost of $2.00 from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Being a Congressional document, each member of Congress has an allotment of the new yearbook for free distribution.

Named *Science in Farming*, the book contains 1,094 pages and includes 135 reports and 136 pages of pictures on research during the past few years on the breeding and feeding of livestock, animal diseases, poultry, genetics, plant growth, vegetables, field crops, plant diseases, trees and farm forestry, fertilizers, conservation, irrigation, soil amendments, insect pests and bees, new insecticides and fungicides, new uses for farm crops, dairy by-products, food, clothing, machines for various crops, storage, new uses of wood, farm practices, marketing, and the meanings of the new technology. The 158 contributors are technicians in the USDA and laboratories throughout the country. They deal with discoveries made in nearly every state and several foreign countries.

The purpose of the book, as set forth in a preface by the editor, Alfred Stefferud, is: "It offers a background for understanding the further results of research as they are announced from day to day. Its purpose is to help everybody to make the most of the products of the laboratory, the test plot, and the pilot plant. . . . This book was prepared primarily for farmers, but we have always had in mind other persons whose interests have to do with gardening, chemistry, beekeeping, stock raising, conservation, horticulture, housekeeping, and such. The Yearbook should be particularly useful to returning servicemen who want to farm and to persons who will find in these pages details of a product that may help them build or enlarge businesses of their own."

For example, Benjamin Schwartz, of the Bureau of Animal Industry, tells how to use rotenone, phenothiazine, sulfa drugs, skim milk, and other preparations to control parasites that do untold damage to our supplies of meat and leather.

L. T. Giltner, of the same Bureau, describes methods of combating animal diseases, including brucellosis, mastitis, rabies, and the dread avian pneumoencephalitis, a threat to the poultry industry.

An article by N. R. Ellis tells how to judge by feeling of her udder whether a young calf will become a good milker. Other papers treat of developments pertaining to goats, horses, mules, swine, and sheep.

Dr. F. C. Bishopp, assistant chief of the Bureau of Entomology and Plant Quarantine, has written a brief article that introduces the section on insects, including DDT in the home, garden, and field; the chemistry of DDT, insect repellents, pests that attack man, insecticides for cotton, and stock pests. Dr. Bishopp mentions an estimate that mites, ticks, and insects cause an annual loss of more than a billion dollars, and says, "Although our insect enemies assess this burdensome tax on our people, on the other side of the ledger we have a number of insects that contribute millions to our food resources through the pollination of our seed and fruit crops. Confronted with this situation, there is every reason for the entomologists to put forth herculean efforts to control our insect enemies and to protect our insect friends. There is also every reason for our people to become familiar with these foes and friends and with the weapons scientists are developing to combat the former and the means they are evolving to husband the latter."

In a foreword, Secretary of Agriculture Clinton P. Anderson says of the new developments in agricultural science: "I have great joy of them, as a fruit of man's brain and hand, of his patient research, ingenuity, will. These developments the American farmer combined with his sweat and skill to perform the miracle of food production during the war. They have had a part in increasing by 70% in 25 years the average efficiency of the farm worker in the United States. They reveal the possibility of a self-sustaining American agriculture, and are a manifestation of the resources within us and about us. They can give us a better life, a life more abundant for every family."

On the average the first colostrum is three to four times as rich in riboflavin as normal milk.

* * * *

There is much clinical observation that supports a claim of value for autogenous herd bacterins in the prevention of acute mastitis, and also in the treatment of that ailment.

* * * *

A Holstein-Friesian cow in England is reported to have broken all records for milk production for one day by producing 155 pounds at six milkings within 24 hours. The previous record was 149.5 pounds.

* * * *

Dairy farmers are alarmed over the terrific losses caused by breeding troubles and sterility. No one knows for sure, in dollars, what these losses are from lower lifetime production and shorter productive life of dairy animals. Some have ventured guesses. They run in millions. Regardless of the accuracy of these estimates, all dairymen are aware that the problem of breeding troubles and sterility is great.—*Hoard's Dairyman.*

* * * *

The high protein content of colostrum is due to an extremely high amount of globulin. It has been known for some time that this globulin is similar, if not identical to, blood globulin, the protein fraction of the blood that carries the protective antibodies. Recent investigations have shown that the blood of the newborn calf is strikingly low in gamma globulin; but the amount rises quickly following colostrum feeding. When skim milk is fed the globulin content of the blood of the newborn calf remains low for a considerable period.—T. S. Sutton.

* * * *

Champion Lifetime Producer

Silken Lady Ruby No. F 919141, a 16-year-old registered Jersey owned by J. W. Coppini of California, becomes the lifetime butterfat producing champion of the United States, over all breeds. On official production test verified by The American Jersey Cattle Club, Ruby has amassed a lifetime total of 155,988 pounds of milk and 8,550 pounds of butterfat.

Ruby, in addition to producing, has demonstrated her ability to transmit this outstanding production to her offspring. She has four tested daughters, each with several fine records, and her son, Silken Ruby's Lad 388043, a Gold and Silver Medal Superior Sire, is now the highest rated Tested Sire in the Jersey breed with 10 daughters averaging 698 pounds of butterfat per lactation.—*Hoard's Dairyman.*

More is known about the nutritive requirements of chickens than of the nutritive needs of any other farm animal.—*L. E. Card.*

* * * *

In the manufacture of penicillin, by-products of spent broth and mold mycelium are produced in enormous quantities and their disposal constitutes a difficult and expensive problem. An experiment at the Wisconsin station showed these by-products combined with soy bean oil meal and fish press water make a satisfactory ration for growing chicks.

* * * *

The Egg as Poison

Eggs with their apparently impenetrable shells seem to offer us a food safe from the risk of conveying bacterial infection, and were long so regarded. When the Three Musketeers of Dumas feared being poisoned they resorted to boiled eggs as above suspicion. It has long been known that this safety is only comparative, since egg shells are not impervious to bacteria, while some birds get behind our defences by depositing from the oviduct pathogenic bacteria directly in the egg yolk. Many investigations have shown that ducks may suffer from epidemics of Salmonella infections due to strains, such as *S. enteritidis* and *S. typhimurium,* which are responsible for outbreaks of food poisoning in man. Certain varieties of ducks are more prone to these infections than others. The infected ducks may transmit the living bacilli into the egg yolk. In other cases the egg may be infected by pathogenic bacilli passing through the egg shell from outside. Egg shells are porous and many workers have proved the passage through the porous egg shell of bacteria from liquids in which the eggs are soaked.

Many outbreaks of food poisoning have been shown to be due to the consumption of infected ducks' eggs. At least two outbreaks of food poisoning have been ascribed to the egg of the hen.

Dried egg powder in tins, now so extensively used to supplement our food supply, is a different matter, and there have been a number of outbreaks of food poisoning from this source. Many investigations have been made into its Salmonella content. For example, Gibbons and Moore, examining Canadian egg powder, found Salmonella strains in 28 samples (7.4%), and all but 5 (*S. pullorum*) were potentially pathogenic to man. Schneider examined 901 samples of high-quality powdered egg used by the U.S.A. armed Forces, and from 32 (3.2%) isolated Salmonella organisms, including several strains known to be pathogenic to man.—*British Med. J.*

Strain 19 Vaccine Confers Enduring Immunity

Field trials indicate that cattle vaccinated against brucellosis as calves, with strain 19 vaccine, remain resistant for three to five pregnancies. During the year supporting evidence was obtained from controlled experiments. Two groups of cattle, vaccinated as calves, had been maintained, with suitable controls, in separate fields for four to five pregnancies, respectively, at the time they were each exposed to 30 million virulent *Brucella abortus* organisms by way of the conjunctiva. In the fourth-pregnancy groups, composed of 19 principals and eight controls, 16 (84.2%) of the vaccinated animals withstood the same degree of artificial exposure that resulted in active infection of all eight of the unvaccinated controls. In the fifth-pregnancy groups, composed of 10 principals and five controls, similarly exposed, nine (90%) of vaccinated animals were protected against an exposure that caused active infection in all five controls. Under the conditions of these tests, the results indicate that strain 19 vaccine, when fresh and properly administered, may be expected to provide a high degree of resistance for five to six years following calf vaccination. —*From the annual report of the Chief of the Bureau of Animal Industry, USDA, 1946.*

Source of Brucellosis in Man

From epidemiologic, laboratory and experimental studies in Iowa it is quite obvious that contact with infected animals plays a more important role in brucellosis in man than does the use of contaminated raw milk supplies. Where organisms of the Brucella group were isolated from human beings in Iowa, the greater share were from men such as farmers, veterinarians and packing plant workers handling infected animals, and the species of Brucella isolated were rarely of the abortus type. On the contrary the abortus species was found in most instances among farm women, young children and city folk, who rarely handle infected animals. Thus we have two distinct routes of infection—infection by way of the skin and by ingestion. From the experimental work with guinea pigs, Hardy and his associate showed definitely how the skin is a more potential route of infection than is the ingestion route. To April 1, 1947, 420 strains of Brucella have been isolated in the State Hygienic Laboratory from human beings of which 259 were of *Brucella suis*, 112 *Brucella abortus* and 49 *Brucella melitensis*. So far we have not found cattle in Iowa infected with *Brucella melitensis*, the human infections with this organism apparently coming from contact with hogs which were found infected with this species.

Pasteurization, if carried out properly, is effective in destroying all three species of Brucella. Although adequate pasteurization of milk and dairy products is effective in controlling brucellosis from those sources, more emphasis must be directed toward the control of the disease in hogs, which in the Midwest are the source of a greater share of brucellosis in man.—I. H. Borts, M.D., *Director, State Hygienic Laboratory, Iowa City in the J. Am. Med. Ass'n.* 5/4/47.

Pulaski and Amspacher, Army Medical Corps, report value from a combination of streptomycin and sulfadiazine in the treatment of seven acute and 10 chronic cases of brucellosis. Neither agent alone was of material value in the treatment of this disease.

Of all herds in New York under the test and slaughter plan of brucellosis control, that were free from the disease on January 1, 1944, more than one-half revealed reinfection in the succeeding 15 months, according to a report by Asa Winter of the State Department of Agriculture.

To determine the prevalence of brucellosis in man and animals in Turkey, serological examinations were made of the sera of 2389 specimens of human and animal sera. Of 1154 human sera 5.9% agglutinated Brucella. Of 759 samples of horse sera, 40% were positive for Brucella as were 62.5% of the mules, 31.1% of the beef cattle, 61% of milk cows, 41.9% of buffalo, 13.3% of sheep and 50% of the samples of goat sera examined.

Fourteen Iowa Veterinarians Acquire Brucellosis in 1946

During 1946 reported cases of brucellosis of man in Iowa totaled 638. Of the 96% of all case reports containing information regarding their history, 74% showed direct contact of the patient with hogs and cows before onset of the illness. Of the remaining 26% giving no history of contact with livestock, it is assumed that exposure resulted through unpasteurized dairy products. There were 75 packing house employees, 55 farm wives, 14 veterinarians and their assistants, 16 farm boys, four farm girls, five who worked in retail meat markets or at locker plants and 11 livestock dealers, truckers, sales barn or dairy workers. The study was made by the U. S. Public Health Service in cooperation with the Iowa State Department of Health.—*J. Am. Med. Assn.*, 134:2, p. 197. 1947.

Foot-and-Mouth Disease Outbreak in Mexico

As has been stated the governments of the United States and Mexico have undertaken a cooperative campaign to eradicate the present outbreak of foot-and-mouth disease from Mexico for the benefit of the livestock industry of Mexico and as a safeguard of our own livestock industry.

The campaign is under the general supervision of Oscar Flores, Under Secretary of Agriculture of Mexico and Maurice S. Shahan, of the U. S. Bureau of Animal Industry. Lic. Flores, a lawyer, is director; Doctor Shahan a veterinarian and a specialist on virus diseases is co-director. These directors are responsible to a Joint Administrative Board composed of Dr. B. T. Simms, Chief of the B. A. I., N. E. Dodd, Under Secretary of Agriculture, and Don Stoops, Assistant Agricultural Attache U. S. Embassy, Mexico City. The Mexican members of the administrative board are Dr. José Figueroa, Dr. Frederico Rubio Lozano and Ignacio de la Torre, all members of the Ministry of Agriculture and Livestock Industry of Mexico. Administrative offices have been set up in Mexico City. They comprise, in addition to the six members of the board, various technical consultants and eight subdivisions—legal, audit, administrative, information, inspection and diagnosis, appraisal and disposal quarantine and disinfection and restocking.

The plan agreed upon contemplates the expenditure of $9,350,000 by Mexico to June 30th—for services, equipment, supplies and personnel $7,600,000; for indemnity, $1,750,000. U. S. contributions to the same date should be $9 million—1½ million dollars for equipment, supplies and personnel and 7½ million for indemnities. In addition Mexico agreed to furnish 25,000 troops for maintaining quarantines.

During the 12 months beginning July 1st Mexico expects to continue expenditures at the same rate. The U. S. will contribute a larger share for the stepped-up operation planned.

From the beginning of the campaign to suppress the outbreak, U. S. and Mexican Officials have been deluged with offers of cures and preventives of the disease. A decision has been reached to try no "cures" and to use no vaccines, but to center all efforts on quarantine and slaughter.

The report to May 17 includes the following record of development in the campaign:

The arrival in Mexico of 130 carloads of power digging equipment, disinfectants, and other needed supplies, together with additional veterinarians, from the United States is stepping up the fight against foot-and-mouth disease into a full-scale offensive.

The officials in charge of the campaign decided, at a series of meetings in Mexico City early in May, to use to the utmost all available resources including manpower, supplies, and funds. This policy, they declare, besides being scientifically sound is also the most economical from a business standpoint. The faster that infected and exposed animals can be destroyed, the less opportunity there is for the disease to spread and the more quickly it can be stamped out.

From the beginning of the outbreak, which was diagnosed last December, up to April 22, the eradication forces consisting chiefly of Mexican personnel, slaughtered and buried about 18,000 animals. Slightly more than half of these were cattle, the remainder being sheep, swine, and goats. In addition, about 75,000 apparently healthy animals have been sent to slaughter in the main quarantine zone in southeastern Mexico in accordance with plans for reducing the numbers of susceptible livestock in that area. The total of about 93,000 animals represents an average slaughter on the premises, plus slaughter by evacuation, of about 775 head a day. The highest rate of slaughter on the premises has occurred since the latter part of March. The officials have now set a minimum goal, for field slaughter, of 1,000 head a day with the expectation of doubling or even tripling this number under favorable working conditions. An additional 1,000 head are to be evacuated for slaughter in accordance with the livestock-reduction program.

Work Oxen Replaced with Mules

Livestock owners have, for the most part, accepted the eradication program as necessary for their own future welfare. Fair appraisals and prompt payment of indemnities for the animals destroyed have helped create a favorable sentiment and increased cooperation from livestock owners. An element that has further enhanced support of the program is the assistance being rendered by Mexican officials in replacing work oxen that are infected with foot-and-mouth disease with mules, which are not susceptible to this malady. This policy helps to sustain agricultural production.

Up to the first week in May, about 12,000 oxen had been slaughtered in the campaign but, through official assistance, these animals have already been partially replaced with about 5,000 mules. Estimates indicate a need for about 50,000 more mules to take the place of oxen to be destroyed because of the disease. The majority of these mules will be obtained from northern Mexican states. Mules of the cotton type, about 14 to 15 hands high, are considered most suitable for the purpose. Necessary supplies of harness, largely hand made, are being obtained. Though the usual procedure is to replace each ox with a mule, some Mexican farmers in the eradication areas are seeking to obtain tractors. Officials are assisting them also.

Eradication Strategy

During the next few weeks and months, the strategy of campaign officials is to concentrate efforts on destroying the several centers of infection that have appeared outside the main zone where the disease first occurred. Suppression of the infection in those outlying areas will reduce the danger to (1) the non-infected areas of Mexico, principally in the northern states, and in

Jalisco and Michoacan, (2) the United States, and (3) Guatemala and other Central American countries. The plans also include a reduction in the number of wild animals that are potential spreaders of infection. These and subsequent operations, according to the plans, will confine the disease to the present main area, which will then be subject to operations on all sides, until eradication is complete.

Full Agreement on Policies

Agreement on all major policies and general methods of conducting field operations was reached by members of the Mexican-United States Commission which met in Mexico City. Besides the members of the Commission, there were also present technical advisors on problems involving personnel, equipment, transportation, finance, legal matters, and public relations. The keynote of the meetings was sounded by director Oscar Flores, representing Mexico, who concluded the discussion of most items on the agenda with the terse remark "It is agreed!"

The major policies governing the conduct of the campaign include the following:

1. An all-out intensive drive to eradicate the disease at the earliest possible date, with outlying centers of infection to receive the first attention.
2. Immediate strengthening of the quarantine.
3. Decision to exclude from the campaign the use of vaccines, alleged cures, or other treatments and to use only the time-tested methods of quarantine and slaughter that have fully demonstrated their effectiveness.
4. Supervision of expenditures through a system of joint Mexican-United States appraisals of condemned animals and other property, and reciprocal inspection of accounts and records.
5. The fullest possible use of modern digging, disinfecting, and transportation equipment, including some use of airplanes for the quick movement of key personnel, records, and pay.
6. The disposal of more animals by slaughter and burial and a reduction in the number salvaged due, in the past, to lack of adequate burial facilities, a lack that is rapidly being overcome by the arrival of more mechanical equipment.
7. Agreement to permit representatives of Mexican livestock associations to serve as consultants in the appraisal of purebred and other improved stock.
8. Consultations with persons representing fighting-bull interests for the purpose of obtaining proper valuations on the four recognized classes of these animals.
9. Continued assistance to owners in the replacement of work oxen with mules or tractors, together with other measures for reducing the impact of the eradication program on the agricultural economy of the affected areas.

Seasoned Veterinarians Participating

To give United States participation in the joint campaign maximum effectiveness, the USDA has assigned to duty in Mexico several of its most experienced veterinary specialists aided by a staff of younger veterinarians also of demonstrated ability and resourcefulness in field work. The United States group, which will work with their Mexican colleagues in supervising field activities, includes several veterans of former outbreaks of the disease in the United States. They are Dr. M. S. Shahan, co-director of the campaign; Dr. L. R. Noyes, Dr. F. M. Shigley, Dr. A. W. Rice, and Dr. A. E. Wardlow. The United States staff, early in May, included approximately 25 veterinarians, with 75 more to arrive shortly. An office force will largely relieve them of business and other routine administrative details. The operations include a system of full reports so that both countries may be reliably and periodically informed of the progress of the joint undertaking.

USDA to Buy Mules for Mexico

The USDA announced May 16th that a program under which mules will be purchased for the Mexican government will be initiated at once. The purchases are being undertaken as a service to the Government of Mexico and will be on a completely reimbursable basis.

The mules obtained under this program will be used to replace work oxen which are being destroyed as part of the foot-and-mouth disease eradication campaign in Mexico. The Livestock Branch of the Production and Marketing Administration will carry out the purchase operations of the program for the account of the Mexican government. While final arrangements have not been made as to the number of animals to be purchased, the initial plans indicate 20,000 or more. The animals will be purchased under arrangements similar to those used for buying draft animals for UNRRA in 1946.

Details on the program are obtainable from E. J. Cronkhite, Livestock Branch, Production and Marketing Administration, USDA, Washington 25, D. C. All purchases will be made on a bid basis. Invitations to bid, which will be issued to the trade by the Livestock Branch, will also give details as to specifications on the type of animal desired, as well as other information.

One of the herds slaughtered and buried early in the campaign belonged to an American citizen, living in the Toluca Valley about 40 miles south of Mexico City on the Jeffcott ranch. The livestock consisted of six Hereford bulls, 45 Hereford cows and heifers and one calf, five Holstein-Friesian cows, 487 sheep and six hogs. The Herefords were registered purebred animals. Handling the herd of a wealthy American citizen just as work oxen of his less affluent neighbors created a favorable impression.

The Most Fertile Season

An analysis of the breeding record of the University of Nebraska dairy herd (Ayrshire, Guernsey, Jersey and Holstein-Friesian) over an eight-year period during which artificial insemination was employed led to conclusions that (1) a greater number of inseminations (2.24) per conception is required in August than in any other month, (2) it is not possible from the breeding efficiency of one year to predict the number of inseminations per conception that will be required subsequently, (3) the number of inseminations required in a virgin heifer bears no relationship to the number required in after years, and (4) some families have a low breeding rate while in other families the rate is much higher.

Shoulder Lameness of Horses

By ISAAC E. HAYES
Waterloo, Iowa

BECAUSE of its heavy muscular padding and relative scarcity of ligamentous and tendinous support a claudication of the shoulder region may make a correct diagnosis and successful treatment difficult. Many animals with a mild shoulder lameness never receive professional attention but the trainer and track "expert" label each and every case with their favorite diagnosis such as "pulled shoulder," "shoulder strain," or "hidebound," and thereupon follow this favorite diagnosis with an equally favorite treatment, usually consisting of special paints, braces, or even insufflations of air. Obviously, a more differential diagnosis and definitive treatment is expected of the professional man. Lameness due to azoturia, rheumatism, fractures, and luxations will not be considered here.

When acute and of recent occurrence, disturbances of this area are not difficult to diagnose but, when chronic and there is little limping, it is often difficult to locate the seat of the trouble. Also, when of a mild character the injuries of this region are hardest to diagnose in animals of a phlegmatic temperament, that lead poorly, have a poor way of going, and are of a skittish nature. Taking it for granted that the feet of all lame horses are carefully examined first, these cases are best shown by horses that are shod and made to travel on a hard, even surface. If considerable gaiting is needed to observe the patient it is well to have the horse ridden bareback so that the rider's posting can neither consciously nor unconsciously affect the animal's gait.

Bursitis Intertubercularis

Possibly the most common, serious injury to the shoulder is an inflammation of the bursa of the biceps tendon—bursitis intertubercularis. This condition is found in both acute and chronic types and is practically always caused by violence. Polo collisions, runaways, falls, slipping when arising, or plunging into the manger when frightened are common causes of this disease.

Symptoms.—In the acute form swelling and severe pain are in evidence. The swelling, while often not indicative of the severity of the injury, is directly over the point of the shoulder. Extension of the leg is accomplished with difficulty while backing is considerably easier. A hard cartilaginous swelling may be directly below the point of the shoulder which is the result of an abrasion of the cartilage of the bicipital groove. Both the swinging-leg and supporting-leg types of lameness are manifested. If the animal will step at all, the stride is short.

As the condition becomes chronic, the lameness is less apparent. The only symptom may be a slight shortening of the stride. A bony swelling (exostosis) may be palpable on the anterior head of the humerus. One *almost* pathognomonic symptom of this disease can be demonstrated by raising the foot to the height of the carpus and pulling it sharply toward the hock of the same side. This manipulation causes a definite wincing. If need be a comparison can be made with the sound leg. When standing, these patients usually stand with the injured member a little to the rear of the sound one. In chronic cases progression is more difficult than support.

Treatment.—In acute cases the general treatment for a traumatic bursitis is indicated. Rest in a *level* box with a medium thickness of bedding should be the first consideration. Flushing with the hose for long periods or ice packs suspended over the withers from the sound leg along with mild stimulating liniments help to allay the acute inflammatory process. If the hoof is long, as is often the case in show horses, the shoes should be removed and hoof shortened. The sound limbs should not be overlooked but should be bandaged and massaged regularly. This injury often happens to animals in training and a word to the trainer regarding the reduction of heavy

feed is in order. Everything should be done conducive to the comfort of the animal. Training should be suspended for several weeks, until there is absolutely no indication of inflammation in evidence.

A more vigorous treatment is indicated in chronic cases. Some are incurable. Cautery and internal firing have been tried with variable results. A good treatment consists of a heavy iodine-ether blister being forcefully applied with a brush over an area a foot in diameter directly over the bursa.[1] This treatment should give rise to an acute, painful swelling immediately. After the acute pain of the blister has subsided, *i.e.*, in about an hour, the animal should be turned out *alone* in a *level* paddock and given a run of at least six to eight weeks. Old standing cases with moderate lameness are often benefitted by shoeing with thickened heels.[2]

Strain of the Infraspinatus

Another common type of shoulder lameness found in sporting horses is a strain or rupture, partial or complete, of the infraspinatus muscle or tendon. Most often the area of the tendon is involved primarily. Again, external violence such as kicks, bad falls, polo collisions and slipping, causes most of these injuries. The force causing this injury is delivered from a more lateral angle than that causing the bursitis intertubercularis.

Symptoms.—Although most lameness of the shoulder region is of the swinging-leg type this injury of the infraspinatus always manifests itself as a supporting-leg lameness also. The shoulder joint always rotates outwardly when the leg is in support and the amount of rotation is in direct ratio to the degree of injury. This rotation of the joint also causes the flight of the leg to be abnormal in that the lower leg travels mesial to its normal flight when viewed from in front. The general appearance of the leg at the instant of support is a rather mushy or springy type of action as the leg seems to be cushioned and gives away when subjected to stress. This springiness does not seem to be accompanied by a great deal of pain.

As the condition becomes chronic the animal may not show any symptoms when walking, but it shows the foregoing symptoms when made to jog. More often than not the unsound leg is pointed ahead of the sound one when standing. An indication of chronicity is an abnormal prominence of the spine of the scapula, which denotes atrophy of the muscles fore and aft. This may occur practically over night.

Treatment.—Again complete rest is the primary consideration along with the hose, ice packs and mild liniments. If the injury has not been extensive this treatment is sufficient.

If, after the acute inflammatory process has abated, as indicated by the absence of pain upon manipulation, a definite weakness of the tendon still is shown, the treatment should be directed towards strengthening and reuniting the tendon. Injection of counterirritants directly into the damaged tissue is indicated. Care must be made that the joint and bursa are not invaded. This treatment should be continued at intervals as long as the outward rotation of the joint remains. Best results have been had by the author when first the tendon was treated and followed by treatment of the atrophied muscle, after the lower tendon had been strengthened. This method requires more time and the expense is greater. In cheaper animals it may not be justified. In treating the atrophied muscle it is well to repeat injections often enough to keep the tissue in a constant state of irritation and to keep the animal exercising regularly.

Shoulder Atrophy

A third type of lameness involving the shoulder area is the commonly called "shoulder slip" or "sweeney," which is an atrophy of the supraspinatus and infraspinatus muscles either alone or together. In most cases this disease is a result of paralysis of the suprascapular nerve.

The commonest injury causing this disease is thought to be a hard blow on the shoulder at the instant the member is not in support thus forcing the leg back and thereby stretching the short, thick suprascapular nerve with resulting dystrophia. There is evidence that it may follow azoturia and rheumatism. The author has seen it twice following a severe firing of the carpus which surely could in no way have involved the suprascapular nerve but was very likely an atrophy of disuse. This condition is most common in the draft horse and was most often encountered in the early spring when soft, overweight horses were used to break sod. Old collars that fitted well in the fall were too small for animals that had put on weight over the winter. The use of these collars plus the fact that sometimes the draft was uneven caused the disease.

Symptoms.—Diagnosis can be made before the horse is led from the stall. The first thing noted is an abnormally prominent spine of the scapula. When moving at a walk the animal may not show any difficulty of progression but when weight is put on the leg the shoulder joint rotates outwardly and cushions the impact as it does in strain of the infraspinatus tendon. At the trot extension of the joint is not complete. Severe pain is seldom manifested by the animal.

Treatment.—Any of several tissue irritants

may be injected into the atrophied muscle. Some authors think terebinthinae should not be used because it causes sterile abscesses; others recommend its use for that reason. Injections should be made *evenly* over the diseased area and *into* the muscle tissue, if possible. Repeated injections should be made so that the muscle is always in a state of excitation. A good diet of high protein feeds plus daily access to a paddock aids in curing these cases. No animals should be put back to work in harness until either pronounced completely cured or given up as incurable.

Paralysis of the Radial Nerve

A fourth type of shoulder lameness is caused by a paralysis of the radial nerve. Various causes have been blamed for this condition but it is seen most often in animals that have been working in harness, indicating an external injury or strain to be the exciting cause. It has been seen in animals cast for a long period during operations, etc. Since a fracture of the first rib often accompanies this disease some authorities concluded that the paralysis is a result of the fracture. The fracture was blamed for causing an unnatural pressure on the nerve and nerve plexus by effusions of blood or by the pressure of the misplaced rib itself. This theory has been discarded since the disease has been seen many times when no fracture of the rib co-existed.

Symptoms.—Inability to extend the leg and inability to bear weight on it are the two outstanding symptoms. The elbow is dropped in such a manner as to make the leg appear too long. The foot is held well in advance of the normal leg and sometimes only the toe touches the ground. When sufficient pressure is applied to the front of the carpus and the animal is forced forward the weight can be borne without pain. If pain is extremely severe and emaciation and cachexia remain after a couple weeks, a fractured first rib must be considered. Manipulation of the member toward the opposite side may reveal a crepitation when the stethoscope is held close to the injury.

Treatment.—Treatment of a fracture of the first rib is considered futile. All effort must be directed towards making the patient comfortable. If need be, slings should be employed to induce the animal to remain standing. The method of Merillat which involves the use of a breeching and quarter straps forward to the carpus thereby holding it in place is a type of rigging that is efficacious, easily obtainable, and is well tolerated by most patients.[3] Here again the uninjured members should receive attention and care. Improvement is usually noted within a period of a month.

Shoulder Lameness Through the Years

Throughout the history of veterinary medicine "shoulder lameness" has received more attention than its frequency and importance justified, probably because there was little agreement as to the causes or symptoms.

The utter confusion on this subject that existed in the minds of early veterinary writers, and presumably also in the minds of practitioners, is shown by the fact that practically every accident or overexertion to which a horse may be subjected has been listed by one or more writers as a cause of shoulder lameness. The listed symptoms have run an equally full gamut. Nor have the recommended treatments been less varied.

Of the latter, one of the strangest was swimming. John Hinds, a veterinary writer, but not a practitioner, in his Farriery, which was probably simply a compilation of the works of others, states: "Swimming the horse for strain in the shoulder joint was a favorite remedy formerly. It seems this treatment received some unfavorable publicity about 35 years earlier (about 1789), when Dennis Lawler a stableman "who performed the cure most adroitly by swimming the horse in Dublin Bay" came to a tragic end. "His manner was to ride the horse to a convenient depth of water, and then jumping forward suddenly on the animal's head, thus souse it head foremost to the bottom. The feat caused great marvel at the time." Unfortunately on one occasion the horse returned to shore riderless and poor Dennis was seen no more.

Other treatments included venesection, laving with spirits of wine, roweling (when the swelling was very high) and "boring and blowing and laying on a charge."

Ignorant as Hinds was, by "reading between the lines" some interesting deductions can be made. Thus "*Causes.*—Much the same as those which occasion concussions, blows and numbness of the foot, with their consequences which we consent to call strain of the coffin joint without the most distant possibility of knowing whether this misfortune ever has happened." This seems to imply that 150 years ago, as has happened far less remotely, many ailments of the foot were diagnosed as injuries of the shoulder. Perhaps that is just as well, since, as a treatment, swimming was undoubtedly just as efficacious and surely less inhumane than "drawing the sole" a sovereign remedy for ailments of the foot.

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Concentration of Sulfadiazine, Sulfamerazine and Sulfamethazine in the Blood of Cattle

Preliminary Report

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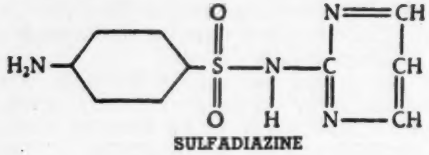
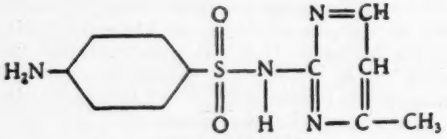
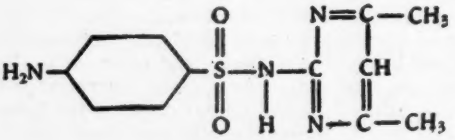
DURING recent years three closely related sulfonamide compounds (sulfadiazine, sulfamerazine and sulfamethazine) have been of considerable interest to investigators and clinicians. The chemical structural formulae are as follows:



SULFADIAZINE



SULFAMERAZINE



SULFAMETHAZINE

Schmidt and associates[1] have studied these compounds in great detail, using mice, rats, dogs and monkeys. In these experiments they have shown variations in absorption from the digestive tract, in elimination from the body by the kidneys, and in toxicity.

Reports by Thorp,[2] Welsh, *et al.*,[3] Thorp and Straley[4] and Jones[5] have indicated additional variations in blood concentrations when sulfonamides are administered to cattle.

A comparison of the degree and rate of absorption from the gastrointestinal tract and the duration of blood concentration of the free drugs are of particular interest.

The experiments reported here were designed to compare the concentration of free sulfonamide produced in the plasma of normal cattle by the administration of a single intravenous or oral dose of sulfadiazine (2-sulfanilamidopyrimidine), sulfamerazine (2-sulfanilamido-4-methylpyrimidine), or sulfamethazine (2-sulfanilamido-4, 6-dimethylpyrimidine) at various intervals of time following comparable doses of each compound.

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Procedure

Twelve female animals were selected for the experiment. Hereford, Angus, and crossbred animals between seven and ten months of age were in the group. Their weight ranged from 280 to 465 pounds with an average of 363 pounds. The animals were maintained in a comfortable stable during the experiment. Whole oats and mixed hay were fed *ad libitum*. Drinking water was accessible to all animals during the day but was not accessible at night.

The calculated intravenous dose of the sodium salt of each sulfonamide was 0.07gm per kilogram (approximately one-half grain per pound) of body weight and was administered as a 6 to 10% aqueous solution. An intravenous outfit consisting of a 250cc bottle and suitable rubber tubing, equipped with a flutter valve attachment and a 14-gauge three-inch needle, were used. Injections were made into an external jugular vein.

The oral dose of the acid form of each compound was calculated on the basis of 0.14gm per kilogram (approximately one grain per pound) of body weight and was given as a drench in 0.5% tragacanth suspension.

In the beginning of the experiment six animals received sodium sulfamerazine and six received sodium sulfamethazine. Four days later the same procedure was followed except that the acid form of the compounds was given orally.

One week after the sulfamerazine and sulfamethazine experiments were conducted, six animals (three that had received sodium sulfamerazine and three that had received sodium sulfamethazine) were given sodium sulfadiazine, intravenously; six other animals (three that had received sulfamerazine and three that had received sulfamethazine, were given an oral dose of sulfadiazine in 0.5% tragacanth suspension.

Administrations of the drugs were made between 8:00 and 9:00 a.m. Blood samples were collected at intervals of 1, 2, 4, 8, 24 and 48 hours after administration of the drug. Assays for the determination of free sulfonamide in oxalated plasma were carried out immediately after each group of blood samples were collected. The method used was that of Bratton and Marshall.[6]

Results

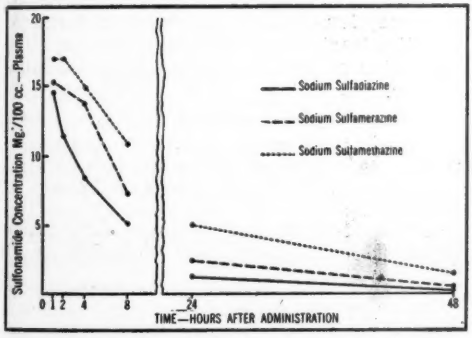
The average plasma concentrations of free sulfonamide for each group of animals at specific intervals of time following intravenous injection of the three sulfonamides are presented in Table I.

TABLE I.—AVERAGE PLASMA CONCENTRATIONS OF FREE SULFONAMIDE IN THE BLOOD OF SIX CALVES AT INTERVALS AFTER A SINGLE INTRAVENOUS INJECTION OF 0.07GM PER KILOGRAM (APPROXIMATELY ONE-HALF GRAIN PER POUND) OF BODY WEIGHT

Interval after administration	Sodium Sulfadiazine mg/100cc	Sodium Sulfamerazine mg/100cc	Sodium Sulfamethazine mg/100cc
1 hour	14.6	15.3*	17.0**
2 hours	11.5	14.8**	17.0
4 hours	8.5	13.6	14.8**
8 hours	5.2	7.4	10.9
24 hours	1.3	2.5	5.1
48 hours	0.3	0.6	1.5

*Average of four animals.
**Average of five animals.

The average plasma concentrations for each group of animals following the intravenous exhibition of the compounds also are presented graphically in Chart I below.



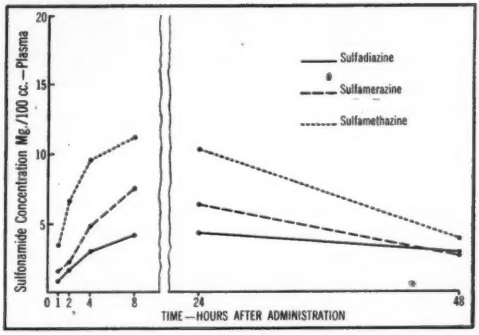
The average plasma concentration of free sulfonamide at any time following administration of the compounds was found to be the highest in the animals that received sodium sulfamethazine and the lowest in the animals that received sodium sulfadiazine. Eight hours after the intravenous injection of comparable doses of sodium sulfadiazine, sodium sulfamerazine, and sodium sulfamethazine the values for free drug in the plasma were, respectively, 5.2, 7.4 and 10.9mg per 100cc of plasma, while at 24 hours they were 1.3, 2.5 and 5.1mg per 100cc.

The average plasma concentrations of free sulfonamide at the stated intervals following oral doses of the three sulfonamides are presented in Table II.

TABLE II.—AVERAGE PLASMA CONCENTRATIONS OF FREE SULFONAMIDE IN SIX CALVES AT INTERVALS AFTER A SINGLE ORAL DOSE OF 0.14GM PER KILOGRAM (APPROXIMATELY ONE GRAIN PER POUND) OF BODY WEIGHT

Interval after administration	Sulfadiazine mg per 100cc	Sulfamerazine mg per 100cc	Sulfamethazine mg per 100cc
1 hour	0.8	1.5	3.4
2 hours	1.6	2.2	6.7
4 hours	3.0	4.9	9.5
8 hours	4.2	7.5	11.1
24 hours	4.3	6.4	9.3
48 hours	2.9	2.7	3.9

The average plasma concentrations for each group of animals obtained following oral doses of the three compounds also are presented graphically in Chart II below.



Again the highest concentration of free sulfonamide in the plasma was found in the animals that received sulfamethazine, and the lowest in those that received sulfadiazine. These data show that sulfamethazine produced a significant plasma level (6.7mg per 100cc) within two hours, at which time the levels of the other two drugs probably were not of clinical significance (1.6mg per 100cc for sulfadiazine and 2.2mg per 100cc for sulfamerazine). The highest concentration of each drug was observed in the sample collected eight hours after administration of the oral dose. It is unfortunate that blood samples were not collected and analyzed at 12 hours, since it is possible that these samples might have contained a higher concentration of drug than did the 8-hour and 24-hour samples. It is of interest to note that the 24-hour sample collected from the animals that received sulfamethazine and sulfamerazine contained 9.3 and 6.4mg per 100cc respectively. This would indicate that it may be possible to maintain appreciable and possibly therapeutic concentrations of these two compounds by single daily oral dose of 0.14gm per kilogram (one grain per pound) of body weight.

It is of interest to note that 48 hours after

the oral administration of the sulfonamides there was an appreciable concentration of free drug in the blood of each group of animals. These concentrations, however, probably were too low for satisfactory therapeutic activity.

The question of the plasma binding of these sulfonamides must be kept in mind. Just what influence this may have on the therapeutic usefulness and efficacy of these drugs must await further clinical information. Studies have been reported in human medicine to show that with equal blood levels sulfadiazine and sulfamerazine are comparable in therapeutic usefulness. For use in cattle there have been several reports[2,7,8] in which sulfamerazine has been found clinically useful but we must await further information on sulfamethazine before a definite answer can can be given on the practical importance of plasma binding.

The average concentration of sulfonamide in the plasma of calves was greater 24 hours after a single intravenous dose of sodium sulfamethazine than it was after a single dose of either sodium sulfadiazine or sodium sulfamerazine

Beyer, *et al.*,[9] found that the plasma binding of these three compounds in dogs were, respectively, sulfadiazine 16.4%, sulfamerazine 36.5%, and sulfamethazine 60.7% at plasma levels of 5.3 to 6.2mg per 100cc. Qualitatively this same order of plasma binding also has been observed in human plasma.

One week following completion of the experiments, the animals were slaughtered. Post-mortem examination of all vital organs revealed no abnormal conditions except in one animal. This calf showed evidence of a previous respiratory infection, possibly pneumonia. A small area of lung tissue was consolidated and contained a small amount of purulent exudate. Other organs appeared to be normal. Sections of liver and kidney were examined microscopically and found to be normal.

Summary

The average concentration of sulfonamide in the plasma of calves following a single intravenous dose of *sodium sulfadiazine* fell from a maximal value (at one hour after administration) of 14.6 to 1.3mg per 100cc of plasma 24 hours after administration; with *sodium sulfamerazine*, the comparable figures were 15.3 to 2.5mg per 100cc; and with *sodium sulfamethazine*, 17.0 to 5.1mg per 100cc.

The average concentration of sulfonamides in the plasma of calves following a single oral dose of *sulfadiazine* rose from 0.8mg per 100cc at the end of the first hour to 4.2mg per 100cc eight hours after administration. At 24 hours the average concentration was 4.3mg per 100cc. With *sulfamerazine* the concentration was 1.5mg at the end of the first hour and 7.5mg per 100cc at eight hours. At 24 hours the average concentration was 6.4mg per 100cc. When *sulfamethazine* was administered the concentration was 3.4mg at the end of the first hour and 11.1mg per 100cc at eight hours. At 24 hours the average concentration was 9.3mg per 100cc.

These data indicate that the rate and degree of absorption of these compounds from the digestive tract of calves were greater for sulfamethazine and sulfamerazine than for sulfadiazine.

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Bacteriological Study of Swine Pneumonia in Egypt

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WHILE investigating serious outbreaks of swine fever [hog cholera] at two big farms near Cairo, where hundreds of swine were lost, almost every case was found complicated with secondary organisms in the chest cavity, intestinal tract or in both. These organisms were thought worthwhile investigating since they should be considered in prophylaxis and treatment.

The bacteriology of swine pneumonia has been investigated by many workers. M'Fadyean (1898) made a bacteriological study of 10 lungs of pigs that died from pneumonia. *Salmonella suipestifer* was isolated from pigs that died from pneumonia. *S. suipestifer* was isolated from two lungs and *Pasteurella suis* from six, while from the remaining two lungs unidentified organisms were isolated. Stengel and Fox (1927) stated that pneumococci, staphylococci and *E. coli communis* were among the organisms responsible for pneumonia. Moore (1908) stated that *P. suis* was the main cause of swine pneumonia. Kinsley (1914) stated that *Pseudomonas aeruginosa* might cause catarrhal pneumonia in pigs. Birch and Benner (1920) isolated *Ps. aeruginosa* from pneumonic lungs of swine at a hog cholera serum plant in New York. They also isolated the same organism from affected lungs sent to them from various parts of U. S. A. Spray (1922) examined 314 pneumonic lungs. *P. suis* was isolated from 54% and an inulin fermenting Streptococcus from 35% of the cases. Koen (1922) stated that *P. suis* was the cause of swine pneumonia and that in advanced cases there was usually pleuritic adhesions. Miessner and Wetzel (1928) isolated diplococci, streptococci, *Ps. aeruginosa* and *P. suis* from pneumonic lungs of swine. Kinsley (1936) stated that *P. suis* causes an atypical catarrhal pneumonia in swine which could be demonstrated in all its stages. Koen (1938) states that the lesions of swine plague predominate in the thoracic cavity. They are characterized by diffuse or blotchy hemorrhages of the serous membranes or organs. There may also be similar hemorrhages in the abdominal cavity and in the muscle tissue. The bronchial lymph glands, or any others that may be affected, are congested throughout. At the outset there may be only small hemorrhages on the heart, or extreme congestion of the lungs that will be followed later by all stages of hepatization. There is usually more or less pleuritic adhesions. Thorp and Tanner (1940) examined 223 pneumonic lungs of pigs. Of 38 apparently normal lungs they could only isolate a Streptococcus from one case, whereas from 47 lungs showing gross lesions they failed to isolate organisms; from the remaining lungs, however, they isolated Pasteurella, streptococci, diplococci, staphylococci, *Alcaligenes faecalis* and miscellaneous

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gram-negative and gram-positive rods. Langham, Thorp and Ingle (1941) isolated *P. suis, S. suipestifer,* beta-streptococci, *Staphylococcus aureus, Staph. albus,* diphtheroids and *Escherichia coli* from five cases of pneumonic lungs of pigs. Kelser and Schoening (1943) stated that *Corynebacterium pyogenes* is a common cause of various pyogenic processes in cattle, sheep and pigs. This bacterium also causes suppurative pneumonia and arthritis in pigs.

Experimental

Pneumonic lungs taken from dead pigs in private farms as well as from slaughter houses were collected for bacteriological investigation. The affected part of the lung was aseptically opened and the contents plated on ordinary and rich media. The plates were incubated and examined in due time. Various colonies were picked, obtained in pure culture and identified bacteriologically in the usual way. In this work one hundred pneumonic lungs were examined.

The organisms isolated may be divided, for sake of simplicity, into two main groups:

I—Gram-positive Organisms

This group included:

1. *C. pyogenes.*
2. Unclassified diphtheroid bacilli.
3. Hemolytic streptococci (alpha type).
4. *Steph. aureus.*

II—Gram-negative Organisms

This group included:

1. *P. suis.*
2. *S. suipestifer.*
3. Coliform bacilli.
4. *Ps. aeruginosa.*
5. *A. faecalis.*

The isolation results are indicated in Table I:

TABLE I.—PERCENTAGE OF ISOLATION OF EACH ORGANISM

Organism	Times of isolation
C. pyogenes	35%
Diphtheroids	25%
Hem. streptococcus (alpha)	5%
Staph. aureus	5%
P. suis	55%
S. suipestifer	5%
Coliforms	10%
Ps. aeruginosa	3%
A. faecalis	5%

In order to determine the bacterial flora of the normal pig's lung 20 normal lungs, taken from apparently healthy animals slaughtered in the abattoir, were similarly examined bacteriologically. The majority of organisms isolated were diphtheroids.

It is thus seen that the most prevalent organism isolated from the pneumonic lungs was *P. suis.* In addition to causing serious outbreaks of swine plague, this organism usually complicates cases of hog cholera, particularly the chronic type. It is this organism, therefore, that should be considered mainly in prophylaxis.

Protective Inoculation Against P. suis

A strain of *P. suis* isolated during this work was used in preparing a vaccine. Various methods were adopted to determine the best way to prepare a potent vaccine. For this purpose a bacterial suspension containing a thousand million organisms per cc was made in the usual way and divided into six lots. Each was treated separately and differently.

No. 1 vaccine killed with 0.5% phenol.
No. 2 vaccine killed with 0.001% formalin.
No. 3 vaccine killed with ether vapor.
No. 4 vaccine killed with chloroform vapor.
No. 5 vaccine killed with alcohol vapor.
No. 6 vaccine killed with heat at 60°C. for 15 minutes.

No. 7 vaccine was prepared by growing the organism in ordinary broth for 10 days at 37° C. after which the culture was filtered through a Seitz filter and the filtrate then used as a vaccine.

These seven vaccines were tested on batches of guinea pigs consisting of 10 animals each. Two doses, 0.1cc and 0.2cc with a week interval were given. A further batch of 10 animals was left unvaccinated to serve as controls. Three weeks after the second dose of vaccine, all the animals were given subcutaneously a test dose of 0.3cc of a 24-hour broth culture of *P. suis,* amounting to three M.LMD. The animals were kept under observation for 15 days during which time deaths were recorded and post-mortem examinations and blood cultures were made. Table II shows the results of the experiment. All the control animals died in 24 hours and the organism was recovered from their blood. The vaccines, on the whole, gave excellent results amounting to 80% protection in the case of the formalized vaccine and that of the culture filtrate, and 100% protection in the remaining vaccines.

In order to investigate the type of immunity conferred by these vaccines, samples of blood were drawn from the immunized animals by heart puncture before the test dose was injected. The sera were subjected to the following serological tests: (1) Agglutination, (2) Complement fixation, (3) Opsonic index. The results of these tests are shown in tables III, IV and V. Note that while the agglutination and the complement fixation tests failed to show any marked difference between the vaccinated and the unvaccinated animals, the opsonic index revealed a definite difference.

TABLE II.—RESULTS OF VACCINE TESTS

Kind of vaccine	No. of animals	No. of animals dying on day 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	No. of survivals	% of survivals
Phenol	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	100%
Formalin	10	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	8	80%
Ether	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	100%
Chloroform	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	100%
Alcohol	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	100%
Heat	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	100%
Filtrate	10	—	1	—	—	1	—	—	—	—	—	—	—	—	—	—	8	80%
Control	10	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0%

Discussion

Considering the bacterial flora encountered within pneumonic lungs of swine, it may be noted that *Pasteurella suis* is the organism most frequently responsible for this disease, being isolated from 55% of the cases examined. *Corynebacterium pyogenes* also is a common cause of pneumonia but is almost invariably associated with the suppurative and gangrenous type of the disease. This organism was also isolated by the authors (1946) from cases of suppurative pneumonia of sheep. In a few cases alpha streptococci, *Staphylococcus aureus*, and *Pseudomonas aeruginosa* were isolated; the last organism being responsible for the catarrhal type of pneumonia. As regards the coliform bacilli, *Salmonella suipestifer* and *Alcaligenes faecalis*, it may be noted that these organisms are normal inhabitants of the intestinal tract and may gain access to the lungs in the last stages of the disease *via* the lymphatics or the blood stream when the animal's resistance is lowered. Since the diphtheroid bacilli also were isolated from the lungs of normal pigs, it is doubtful if they should be regarded as being of any pathogenic significance. These results are in accordance with the findings obtained by previous workers.

TABLE III.—AGGLUTINATION TEST

Kind of vaccine	Serum dilution 1:8	1:16	1:32	1:64	1:128	Control
Phenol	+	+	—	—	—	—
Formalin	+	+	—	—	—	—
Ether	+	+	—	—	—	—
Chloroform	+	+	—	—	—	—
Alcohol	+	+	—	—	—	—
Heat	+	+	—	—	—	—
Filtrate	+	+	—	—	—	—
Control	+	—	—	—	—	—

+ indicates agglutination.
— indicates no agglutination.

Comparing the results of immunization by the different vaccines against *P. suis*, table I shows that all the vaccines gave a survival rate of 100% with the exception of that treated with formalin and that of the culture filtrate each of which gave 80% protection. It must be born in mind, however, that, because of the small number of animals employed, it is impossible to make a comparison on a strict statistical basis.

The agglutination, complement fixation and opsonification experiments indicate that there is little difference among the different vaccines. The agglutination and complement fixation tests showed that sera prepared by im-

TABLE IV.—COMPLEMENT FIXATION TEST

Kind of vaccine	Serum dilution 1:10	1:20	1:40	1:80	1:160	Serum control	Antigen control
Phenol	+	—	—	—	—	—	—
Formalin	+	—	—	—	—	—	—
Ether	+	—	—	—	—	—	—
Chloroform	+	—	—	—	—	—	—
Alcohol	+	—	—	—	—	—	—
Heat	+	—	—	—	—	—	—
Filtrate	+	—	—	—	—	—	—
Control	+	—	—	—	—	—	—

+ indicates no hemolysis (comp. fixed). — indicates hemolysis (comp. not fixed).

TABLE V.—OPSONIC INDEX

Kind of vaccine	Average number of organisms phagocytosed by 100 polymorphonuclear cells
Phenol	30
Formalin	30
Ether	50
Chloroform	45
Alcohol	48
Heat	34
Filtrate	45
Control	10

munization with the different vaccines possess low agglutination and complement fixation titers. This did not exceed 1 to 16 in the former test and 1 to 10 in the latter. In the opsonification tests, however, it was proved by the results recorded that immunity in pasteurella infection is essentially an opsonic immunity. For, while in 100 phagocytes 10 organisms only were phagocytosed in the presence of normal guinea pig serum, an average of about 40 were phagocytosed in the presence of immune serum. Thus showing the development of immune opsonins or bacteriotropins in the sera of immunized animals.

Summary

1. In acute swine pneumonia *P. suis* is the predominant organism. In chronic cases where there is suppuration and gangrene, *C. pyogenes* is the most prevalent organism. Other diphtheroid bacilli are of no pathogenic significance.

2. Various vaccines have been prepared and tested for protective inoculation against *P. suis* and all gave excellent results in experimental immunization.

3. Agglutinins and complement fixing antibodies are present in the immunized animals at a very low titer. Bacteriotropins, however, are fairly abundant and hence immunity in pasteurella infection is mainly an opsonic immunity.

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Dental Deformities of Chinchillas

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APRIL 4, 1947, an adult, male chinchilla was brought, for examination, to the Bureau of Animal Industry, United States Department of Agriculture, Washington, D. C. The animal, about five years of age, was in an extremely emaciated condition and was not expected, by the owner, to live. It was given to us with the stipulation that we could use it for whatever purpose we wished.

The owner, Mr. C. C. Bilderback, of a local chinchilla ranch in Maryland, informed us that this animal, originally a big, vigorous breeder, had shown evidence of malocclusion for the past two or three years, during which time the incisors had been trimmed about four times, giving temporary relief, but gradually developing into a hopeless case.

When the animal was examined we decided to conduct an experiment to see what could be done to alleviate such conditions in future cases, as this animal was not expected to live, regardless of what might be done for it.

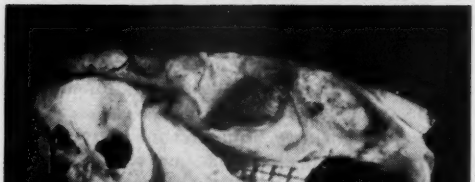
Left: Ventral and dorsal view showing abnormal growth; Right: Ventral and dorsal view showing normal growth. —*USDA Photos by Foubert*

Nembutal anesthesia was given at the rate of 0.1 grain per pound body weight. This is only one-half of the standard dose but it was thought that this would be all the animal could tolerate, because of its emaciated condition. This amount produced a satisfactory anesthesia so that the oral cavity could be examined thoroughly. All the molars were found to be defective. A dental drill was used to trim one of the teeth experimentally, but the deformities were too advanced for satisfactory correction, considering the debilitated condition of the animal. Coramine was used to shorten the anesthesia. The chinchilla recovered and behaved as well as could be expected but died on the third day.

In order to learn as much as possible about this interesting case a complete autopsy was performed. Grossly nothing unusual was observed in the carcass except such changes as are normally observed in extremely emaciated animals. The head was carefully boiled and all the tissues removed so that the dental structure could be thoroughly examined and the following was learned:

The incisors overlapped thus interfering with free motion. The molars were all enlarged to about three times normal size. The upper molars had grown in an outward direction and had very sharp points causing constant irritation to the tissues of the cheeks. The bones of the face showed bulging deformities encasing the roots of the elongated teeth. These deformities were about the size of the crowns of the teeth and projected into the ocular socket and into the area of the maxillary fossa. The lower molars were not quite so deformed as the uppers and were in a normal position but were elongated owing to lack of wear and those of the right mandible were extremely rough. The entire dentition was practically useless for mastication. The mandible also showed bulging deformities corresponding to the roots of the elongated lower molars. This would indicate a softening of the bone but it remains to be determined whether the origin is genetic or nutritional.

[1] From the Bureau of Animal Husbandry, Fur Animal Investigations.



Skeleton of the head of chinchilla; abnormal (above and normal (below)

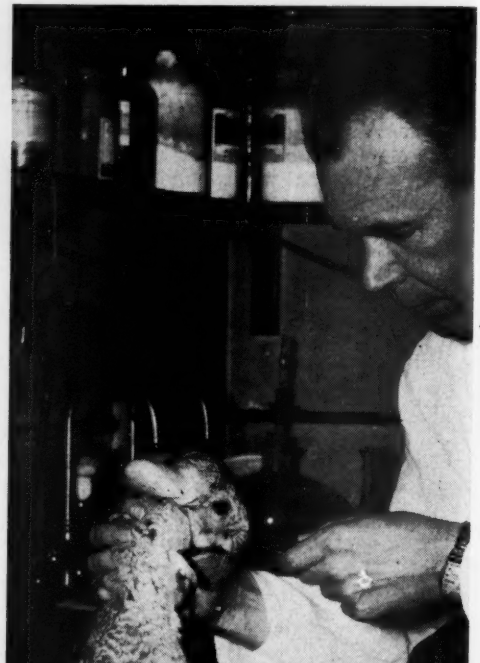
Templeton[2] has conducted a study on a similar condition in rabbits and has concluded that malocclusion in these animals is hereditary.

In regard to other occurrences of this condition it was revealed, by a local chinchilla breeder, that malocclusion, also known as "slobbers," is quite common all over the country but nothing is known about the etiology. One local rancher has had eight cases and another six cases during eight years of propagation. In going over 95 chinchilla autopsy records at Patuxent Wildlife Disease Research Station, United States Fish and Wildlife Service, Bowie, Maryland, it was found that three were diagnosed as dental malocclusion. One of these was from the District of Columbia, one from Virginia, and one from California.

Another condition also commonly referred to as "slobbers" in chinchillas has been observed by the writer. This has nothing to do with dental malformation but is caused by wads of timothy hay lodging under the tongue or in the cheeks causing severe swelling and resulting in inability to eat and even death if not detected and removed in time.

In determining the cause of dental deformities, particularly if the root is involved, one would naturally consider the possibility of a faulty calcium-phosphorus ratio. It is known that an abnormal ratio of calcium to phosphorus in the diet may result in increased excretion of both elements, and demineralization of the bones.[3] However, in the animal used in this study the entire skeleton was examined and no other deformities of the bones were found. Existing evidence would therefore point to a genetic factor, especially in view of Mr. Bilderback's statement that malocclusion has been observed in the offspring of animals suffering from the condition.

We are therefore confronted with two problems. One is to devise a mouth speculum suitable for chinchillas so that dental work may be performed with as little difficulty as possible. Such a speculum should be so constructed that it will hold the mouth wide open and at the same time depress the tongue and push the cheeks out laterally so that dental drills may be applied without injury to the soft tissues. With proper dental care the life of an animal could probably be considerably prolonged and this might be justified in view of the high value of chinchillas. The second problem is to determine whether a genetic or nutritional factor is present, so proper control methods may be employed.



Chinchilla being examined by author—*USDA Photos by Beales*

[2] Templeton, G. S., Malocclusion or Buck Teeth in Rabbits, U. S. Fish and Wildlife Service, Wildlife Leaflet 248, Oct. 1944.

[3] Moore, Robert Allan, Textbook of Pathology, W. B. Saunders Co., Philadelphia 1944.

Observations on Veterinary Medicine in China

By J. R. BEACH*
Berkeley, California

VETERINARY medicine has been given little attention in China's educational program. The country has numerous institutions of higher learning but the only veterinary instruction offered by any of them has been a small amount in connection with animal husbandry in agricultural colleges. The first step toward correcting this educational deficiency was made last year by the establishment of a College of Veterinary Medicine at National Lanchow University. A four-year curriculum is offered and the first students were enrolled in it last November. Dr. H. J. Stafseth, Michigan State College, was in a large measure responsible for government officials becoming conscious of the need for veterinary education in China which resulted in the establishment of the college.

The absence of an opportunity to acquire a veterinary education within China has not been offset by the fact that many Chinese students have been sent to other countries for training in a profession because few of them have been attracted to veterinary colleges. The result of this is that there are in the whole of China only 15 to 20 who can be classed as qualified veterinarians, and all of these are engaged in governmental or institutional work. It is obvious from the foregoing that veterinary practice as we know it, is practically non-existent in China. The only exception is that before the war there were a few foreign veterinarians engaged in general practice in some of the larger cities which had a large foreign population—some dairy herds and a considerable number of riding horses and pet animals. Shanghai, for example, has a well appointed veterinary hospital in conjunction with a dairy, at which before the Japanese invasion there were four British veterinarians. The establishment and one of the veterinarians, Dr. McWhirter, were taken over by the Japanese. Operation of the dairy was continued by the captors and Dr. McWhirter spent the war years in a prison camp. He regained possession of the property after release and is again operating both the hospital and the dairy. This establishment is centrally located in the city and is kept unbelievably clean and free from odors and flies.

The rural areas, therefore, where around 75% of China's 400 to 550 millions of people live are largely without competent veterinary service. This does not mean, however, that the country offers good opportunities for farm practice because the farmer could not afford to pay for the services of a veterinarian if any were available. The average size of a Chinese farm is two to four acres and the income from this small cultivated area is about all the farmer has, to keep his family alive. Consequently all the land must be used to produce crops for direct human consumption, not to feed animals. Draft animals, [cows, water buffalo, donkeys, or mules (a few)] average less than one per farm. The livestock otherwise on a farm, if any, consists of one or two pigs and four or five chickens or a similar number of geese or ducks. These must rustle their own living at which they are very adept. Many farmers, incidentally, cannot afford to keep for their own use the little pork and poultry products which they produce—they need too badly the income derived from their sale, to buy necessities which they cannot raise on their farms. The livestock population of the nation, however, is not as small as the small number per farm suggests because there are some 70,000,000 farms.

Economic and agricultural conditions being as they are, the measures for the alleviation of disease among domesticated animals in China have developed exclusively along the lines of the prevention and control of infectious diseases. These have consisted of the production, distribution and application of biological products, i.e., vaccines, bacterins and serums, with particular emphasis on rinderpest which has been endemic in some areas for many years. These products must be supplied and administered without cost to the farmer and in many instances over his vigorous opposition. The average farmer is totally ignorant of how infectious diseases are caused and spread and of the use of biological agents in their control. He is more likely to fear they will be harmful than confident that they will benefit him. Thus, a control program to succeed must have the support of government officials of various levels and a show or actual use of military or police force.

Considerable progress in instituting organized disease control programs has been made before the coming of the Japanese. The outstanding one was probably that developed in Kwangsi province under the direction of Dr. E. A. Rodier of the U. S. in 1934. A magnificent

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production laboratory and school building for the training of technicians was erected and a province-wide organization and program for the eradication of rinderpest was set up and put into operation. All this was wiped out by the Japanese as were other laboratories and organizations of a similar nature.

Since the cessation of the war with Japan, considerable progress has been made in setting up within the Ministry of Agriculture a National Research Bureau of Animal Industry, the organization and functions of which are similar to our own Bureau of Animal Industry. The plans for the animal disease control work of the Bureau envisages the establishment of five grade A laboratories for research and large scale production of rinderpest and other vaccines and serums and other types of biological products; a larger number of grade B laboratories which will serve as distribution centers of the products of the grade A laboratories and at which bacterins and some serums will be produced; and, a still larger number of grade C laboratories which will be essentially storage and distribution depots and field-service centers. At the present time there is only one grade A laboratory with sufficient size and equipment for effective operation. This laboratory is located at Peiping. It was built by the Japanese, has excellent facilities, and was left intact by them. This laboratory, which is a part of a huge agricultural experiment station is one of the many bits of evidence one sees in North China, that the Japanese expected to remain there permanently. A second grade A laboratory is under construction at Nanking. Much time and money will be required to carry out this rather ambitious plan. If it is carried to completion, however, and the personnel, properly trained for its operation can be recruited, China should be in a position to handle its livestock disease control problems satisfactorily.

The Director of the Bureau is Dr. S. C. Cheng who holds a veterinary degree from Iowa State and a Ph.D. from Johns Hopkins. He has three able associates in Dr. C. T. Cheng who has both a D.V.M. and Ph.D. from Michigan State, Dr. Francis Kwong, a graduate of Cornell Veterinary College and Dr. W. T. Ma, a graduate of the national veterinary school at Alfort, France. These are assisted by a corps of technicians most of whom are graduates of the Chinese Agricultural College in which some veterinary science is taught. The Dean of the new veterinary college at National Lanchow University is T. S. Scheng, M.D., D.V.M. His two medical degrees were acquired in Germany.

Most readers of VETERINARY MEDICINE are probably aware that through UNRRA a large shipment of avianized rinderpest vaccine was supplied to China. This was a new type of vaccine which was developed as a defense measure in a biological warfare program which was conducted jointly by the United States and Canadian War Departments. At first the Chinese veterinarians were somewhat, though understandably, reluctant to have this vaccine put into use because it was delivered in China before any information regarding it had been made public. Their attitude quickly changed, however, when its safety and effectiveness had been demonstrated by potency tests, which were conducted and when copies of the April, 1946, issue of the *American Journal of Veterinary Research* reached China. In this magazine a full report of the research program under which the vaccine had been developed was published. Nevertheless, it was largely through the initiative of UNRRA field veterinarians, Kieth Kestevan of Australia and Robert Reisinger of the United States that field application of the vaccine on a rather large scale was accomplished. Schools for the training of vaccination teams were held; vaccination programs were formulated and given publicity; and on orders from government officials, which were enforced by the military if necessary, cattle and buffalo were assembled for vaccination at designated times and places. In this way all animals in an area in which a program was operating could be systematically vaccinated. Although the difficulties to be overcome were many and varied, by December, 1946, vaccination programs were well under way in two provinces and were nearing the starting point in three others. If the various programs have proceeded according to expectations at least 150,000 animals will have been vaccinated by this time.

Another objective of the UNRRA project was the introduction into China of the method of preparing the avianized rinderpest vaccine. This did not progress as satisfactorily as was hoped principally because of the lack of adequate laboratory facilities and supplies. A group of laboratory workers, however, received training in essential technics and when supplied with certain necessary pieces of apparatus should be able to proceed with preparation of the vaccine. The veterinarians in charge were impressed with the effectiveness and also with low cost of the avianized vaccine, as compared with the type of vaccine formerly being produced. It appears likely, therefore, that the work will be resumed when the necessary facilities become available. To quote from a statement concerning this, "If the effort is successful, another war-inspired project will have made its contribution to peace."

Value of Insecticide and Fungicide Combined in the Prevention of Skin Diseases in Dogs

By LEON F. WHITNEY
Orange, Connecticut

THIS is to report two years' experience in the use of a mixture of fungicide with insecticide in an effort to prevent certain skin diseases to which many dogs are subject, during the warm season. Since it has been so amply demonstrated that the great majority of skin diseases in dogs are due to external infection, and are not as many laymen suppose, "due to bad blood," or "too heatening food" or "too rich food," a mixture of drugs was prepared at the author's request by the Naugatuck Chemical Company, whose cooperation the author gratefully acknowledges. The mixture was as follows:

Cube root, finely powdered	25%
Spurgon (a fungicide)	55%
Inert carrier	70%

Sixteen of the author's cocker spaniels were placed in four pens, each containing four cockers. The experiment was started in April, 1945, well before the damp, Connecticut summer had set in. This damp, moist weather seems exceedingly conducive to the development of fungous diseases. The runs were part of a single large run. Each was filled with four inches of fresh, washed sand. The food was the same, the bedding—oat straw—was the same, the water was the same. Indeed it would be difficult to provide more uniform conditions than those which obtained for all four groups of dogs.

One pen was used as controls and given no treatment. A second pen was treated with cube root 25% and inert carrier, 75%. A third group was treated with spurgon, 5% and inert carrier 95%. A fourth group was treated with the foregoing formula, namely cube root 25%, spurgon 5% and inert carrier 75%.

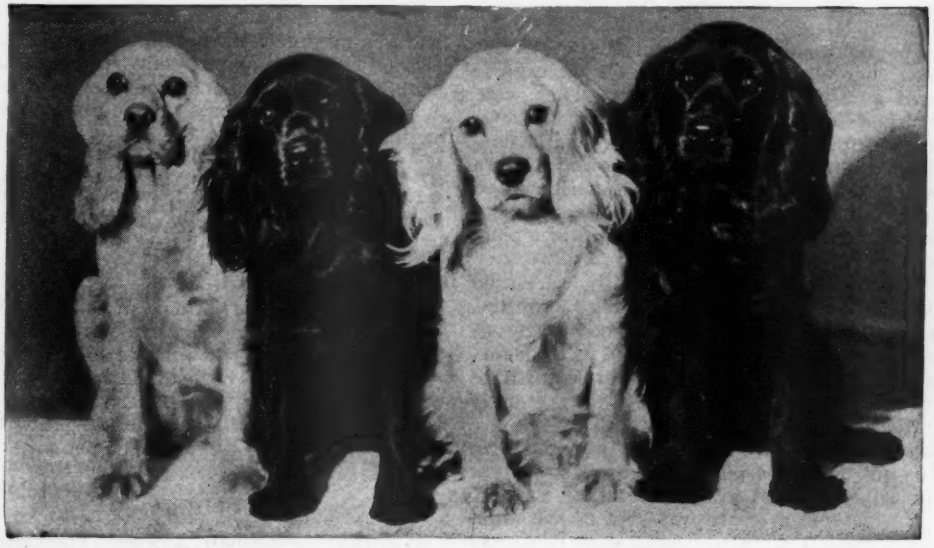
The dogs were treated once a week. A sifter can with coarse holes was used and the dust was spread as evenly as possible over the backs and bellies of the dogs. Each shook itself when returned to the hutch and the surplus fell upon the straw bedding.

The last dusting was during the first week in October.

The results were somewhat unexpected.

The pen dosed with the complete mixture was completely free from skin disease of all kinds, throughout the experiment.

The pen dosed with the spurgon alone showed quite good results. There were bare areas about the hips and tails and some along the back close to the tail. One dog showed some infection on the ears. All had fleas. When a dog became dangerously affected in this pen it was removed and dosed with a skin remedy



In the experiment 16 of the author's cocker spaniels were used—four were placed in each of four pens

until cured and then washed and replaced in the pen. It could not be said that the fungicide alone was a preventive and certainly it was not curative, because the disease progressed slightly despite the weekly treatments.

The dogs in the pen dosed with cube powder and carrier were considerably freer from skin infection than those dosed with the fungicide. They remained free of fleas all the season. Only one developed sufficient infected area to

Ctenocephalides canis (Curtis), head of male. This flea has been found in houses, on the cat, fox, rabbit, rat, woodchuck, man, etc.

warrant removal and treatment for the condition.

The controls were a sorry sight by August first. They all had to be taken off the experiment and treated for dermatitis. They were returned to their pen after treatment and dusted with the combined insecticide and fungicide. One of them developed a second severe attack of skin disease. This we attributed to failure of our treatment to effect a complete cure. A second attempt resulted in a complete cure.

The results of the combination powder used as a prophylactic to destroy fleas and thus prevent their bites (which, theoretically at least, allows for fungous invasion of the skin) and in this way prevent the development of fungi, was so promising, that in the early spring of 1946 a large quantity of the mixture of fungicide and insecticide was prepared. This was put up in one-pint ice cream boxes, since tin cans were not available at that time.

During 1945 a record was kept of the worst cases of skin diseases which were presented for treatment in the author's clinic. This list was studied in the spring of 1946 and 35 cases chosen which had been especially severe and stubborn during the preceding year. The owner of each of these animals was given a box of the combined powder. Each was requested to record on the side of the box the date of each application of the powder. Each promised to report at the end of the season. Not all did report. But now that the 1947 season is at hand, nearly all these persons either reported last fall or have returned this spring asking for more of this powder. Without exception each has maintained that his dog's skin remained in excellent condition throughout the summer of 1946. Their enthusiasm is extravagant in a good many cases. Most of them say that last summer was the first their dogs had not been partially or wholly nude on their backs.

The breeds chiefly treated were cocker spaniels, Scottish terriers, wire haired fox terriers and Boston terriers, but included one Sealyham, one shepherd, three mongrels and one collie.

Discussion: Spurgon was chosen as the fungicide because it is a readily miscible powder, easily incorporated with the other powders and an effective fungicide. Further, it has been shown to be non-toxic, at much higher levels than that used in this test, and has no unpleasant odor. It was reasoned that if fleas are kept to a minimum, there will be fewer places in which fungus spores can gain entrance. Previous experience in the use of insecticides has demonstrated that insect-free dogs seem much less affected with summer skin disease than dogs badly infected with these pests. If both fleas and fungi could be held to a minimum the animal would have the best chance of avoiding skin infection, the combination of fungicide and insecticide was therefore decided upon, with the results given in this report.

* * * *

It is certain that many puppies of tender age are killed annually by too early administration of anthelmintics.—*Vet. Rec.*

* * * *

In a parasite survey of dogs at Duke University *Ancylostoma caninum* ova were found in the feces of 79% of the animals and *Toxocara canis* ova in 25%. The hookworm eggs varied in number from one to 2442 per gram of feces with an average of 413. The range of the roundworm ova was two to 114 per gram of feces with a mean of 52.

* * * *

Hydrophen ointment, popular with physicians as a treatment of ringworm and allied types of dermatitis has been adopted for the use of veterinarians under the trade name hydrophen (veterinary). It contains orthophenylphenol and phenol mecuric nitrate in a neutral lanolin base and is applied by rubbing into the skin like a vanishing cream. It is a powerful fungicide.

The Control of Internal Parasites in Dogs

By L. F. MacMANAMNY, B.V.Sc.
Melbourne, Australia

IT is in the control of internal parasites in dogs that we realize the importance of the laboratory as an aid to diagnosis. Without this help it is hard to realize how any practitioner can obtain a clear diagnosis to assist him in the treatment of worms. It has been said that this dependence on the laboratory does not tend to develop a good clinical sense. To my mind it appears to be impossible to become a good clinician without the aid of the laboratory.

When considering this paper it is worth bearing in mind that this problem is being approached not from the viewpoint of the individual dog, but from the standpoint of the kennel or flock dog.

Before treating any dog for internal parasites, the owner should be questioned carefully as to the following points:

(*a*) The reason for suspecting the presence of worms.

(*b*) The presence of worms or segments of worms noted in the feces.

(*c*) If and when the dog was previously treated.

Then a fecal sample should be taken and submitted for laboratory examination.

In dogs, four types of worms are commonly met with:

Cestodes

The incidence of cestodes encountered in my practice is fairly heavy. Diagnosis is based on

(a) the presence of segments on hair, bedding or in feces;

(*b*) the finding of ova in the feces.

In regard to (b) it is wise to remember that the tapeworm does not lend itself to laboratory methods of diagnosis as readily as do the other types of worms.

Prognosis is usually favorable, though more than one dose of an anthelmintic may be necessary. In heavy infestations a chronic catarrhal condition of the bowel may be present.

Treatment.—Arecoline hydrobromide, gr. 0.1 to 1. With some dogs arecoline may cause vomition, and in these cases it is advisable to feed the animal on milk for 24 hours, fast for 24 hours, and then give the drug. Arecoline usually produces purgation in about 20 minutes. If no bowel action has occurred within this time it is usually advisable to give an enema.

From an economic point of view, tapeworms are of great importance, in that the intermediate stages in the intermediate host do not lend themselves to successful treatment with drugs. Consequently the regular treatment of dogs is most essential.

***Taenia pisiformis*, one of the tape worms of the dog—the larval stage is a small cysticercus, found in the cavities of hares and rabbits**

Tapeworms are of great importance in relation to the health of dogs, as well as from the viewpoint of public health where the serious nature of hydatid disease, and the relation of the dog to infection of the human being must be borne in mind.

Nematodes

Roundworms, *Toxacana canis*, *Toxascaris leonina*, are most common in pups and young dogs, probably because of the chance of *in utero* infection. Diagnosis depends on

(1) presence of worms in feces or vomitus;

(2) presence of ova in feces.

Prognosis is usually favorable, except in very young animals with heavy infestations.

Treatment.—1. Tetrachlorethylene, 0.1cc per pound body weight.

2. Carbon tetrachloride, 0.1cc per pound body weight. This drug should not be given to young animals, or to animals suffering from a calcium deficiency.

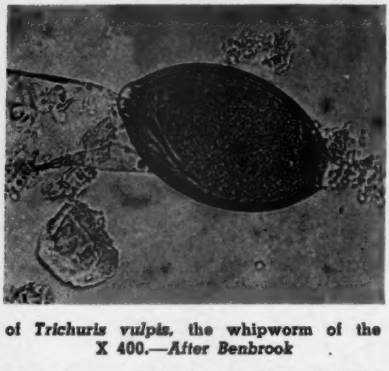
3. Oil of Chenopodium is commonly given

combined with castor oil. Its pungent odor and nauseating taste are disadvantages.

4. Butylphen, p. tertiary-butyl-phenol, is given in capsule form in dose rates of 0.2gm per pound body weight. The results so far achieved are promising, though I have so far given it to only a small number of dogs. The disadvantage with this drug is its bulk. It is advisable to starve the dog for 18 hours prior to treatment, and for a few hours following treatment. It is not necessary to give a purgative either before or after dosage.

Whipworms

Whipworm, *Trichuris vulpis*, infestation appears to be more common than has previously



Egg of *Trichuris vulpis*, the whipworm of the dog. X 400.—*After Benbrook*

been noted, especially in greyhounds. This incidence in greyhounds may be due to the close kennelling and heavy stocking of small areas in which a number of these dogs are kept.

The diagnosis is dependent on the symptoms, such as intermittent diarrhea later becoming continuous, the chutney-like appearance of the feces, anemia in heavy infestations and in later stages a marked emaciation, together with the presence of parasites or ova in the feces.

The prognosis should always be guarded. Treatment of whipworm infestation in dogs is open to much doubt, as no specific drug is known to be effective in the elimination of the worms.

Diphenylamine, given at the rate of 5gm for small dogs and 10gm for large dogs, has given variable results, sometimes promising and at others complete failure.

Sodium arsenite enema has been tried with little or no effect. The removal of the cecum has also been recommended for the elimination of these parasites.

In addition to medicinal treatment, other methods of control of parasitism in the dog consist of:

1. Regular fecal examination.
2. Present *Dipylidium caninum* infection by eliminating the intermediate hosts, such as fleas and lice.
3. The careful disinfection of kennels and yards, regular collection and disposal of feces, and the regular grooming of dogs.
4. Water and food receptacles should be kept clean, and not allowed to become fouled by animals which may harbor parasites.
5. All animals introduced into the kennel should be examined and treated if necessary.
6. Dogs should not be treated and allowed to deposit feces in the same kennel and yards which they are going to occupy permanently.
7. Dogs should under no circumstances be fed raw offal.
8. All pregnant bitches should be treated, if justified. Afterwards, they should be washed and groomed to reduce the contamination of the skin and hair with ova or embryos; and then removed to clean surroundings.

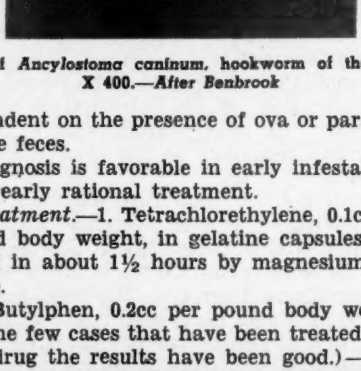
Hookworms

These worms, *Uncinaria stenocephala*, may produce an anemia and enteritis. At first, intermittent diarrhea may be present, which may later become continuous.

It is worth noting that according to Pullar in his survey (1946) *Ancylostoma caninum* does not occur in Victoria.

In my experience, Uncinaria infestation is one of those most commonly met with in practice.

Diagnosis is based on the history of the animal and symptoms, the final diagnosis being



Egg of *Ancylostoma caninum*, hookworm of the dog. X 400.—*After Benbrook*

dependent on the presence of ova or parasites in the feces.

Prognosis is favorable in early infestations, with early rational treatment.

Treatment.—1. Tetrachlorethylene, 0.1cc per pound body weight, in gelatine capsules, followed in about 1½ hours by magnesium sulphate.

2. Butylphen, 0.2cc per pound body weight. (In the few cases that have been treated with this drug the results have been good.)—L. F. MacManamny in *Australian Vet. J.*, 22:6 (Dec.) 1946.

Clinical Reports

Lymphocytomatosis in a Jersey Bull

A seven-year-old, Jersey bull, belonging to a local farmer, was brought to the clinic for examination, October 31, 1946. It had the history of having lost in condition for two to three months. It had been eating till about two days previously.

The bull seemed to be affected mainly in the hind quarters. It had a slight diarrhea, which appeared to be mostly mucus. Rumination was in abeyance. The temperature was 101.5° F. and the pulse and respiration normal. Exercise produced labored breathing. The external lymph glands showed no marked swellings. The eyes protruded from their sockets. Rectal examination revealed swellings of internal lymph glands.

The animal was treated for indigestion. During the treatment it almost collapsed and had a period of labored breathing from which it soon recovered.

The results of a blood examination were as follows:

Total red blood cells 2,970,000 (some stippling and variation in size of these cells).

Total white blood cells 10,200.

Differential count:

Eosinophiles 1%, stabs 7%, segmenters 43%, monocytes 2%, lymphocytes 47% (large 6%, atypical 40%, small 1%).

Due to the presence of great numbers of atypical lymphocytes, this blood count aided in the diagnosis of lymphocytoma.

Five days later the owner informed us the bull could not rise and showed no improvement. We recommended euthanasia and a post-mortem examination.

Upon this examination we found tumorous masses in the myocardial muscle, fat necrosis in most of the abdominal cavity and a great tumor mass involving the pancreas, omasum, abomasum, and duodenum. There were also small tumors in the mesenteric lymph glands along the intestine.

These post-mortem findings confirmed the clinical diagnosis of lymphocytoma.

This condition is quite common in cattle and it is well for one to keep it in mind when confronted with loss of condition, for which no cause can be determined by physical examination or by the history of the case.

C. E. MOLES

Kansas City, Mo.

Carcinoma of the Pancreas in an Aged Cocker Spaniel

An old, spayed, brown and white Cocker Spaniel was brought to our clinic in a comatose condition October 30, 1946. The history tells that she had been a very fat bitch, but five weeks previously had suddenly started to lose weight. She refused her food and vomited quite often. A day or two before being brought to the clinic, she improved a little by gaining her appetite and showing more spirit. After this, her condition grew worse. She vomited her food and refused to walk. She became comatose on the day she was brought to the clinic.

Examination showed her to be very anemic and emaciated. The mucous membranes were slightly icteric. The dog died before any treatment was given. On post-mortem examination we found the following:

1. The gall bladder was very much distended with bile, 8cm long by 3.75cm wide. It contained 80cc of thick coagulable bile. There were no calculi in it.

2. The cystic duct was 1.2cm in diameter and was dilated from the neck of the gall bladder to the entrance into the pancreatic tissue. There was an incomplete stenosis of the opening of the bile duct into the duodenum; since,

Upon examination she was anemic and emaciated

by putting conservative pressure on the gall bladder the bile could be expressed into that portion of the intestine. By careful dissection, it was found that the obstruction was due to pressure of the tissues of the pancreatic duct on the walls of the bile duct into the duodenum; in this case both ducts opened near to each other.

3. The hepatic node was 3.5cm long by 1.4cm in diameter. The medulla of the gland appeared to have undergone liquefaction necrosis.

4. The liver was fairly normal in size but was somewhat cirrhotic and had undergone severe fatty degeneration.

5. The whole pancreatic system seemed to be partially digested and necrotic. The pancreas was slightly enlarged and firmer than normal and an area of fat necrosis was observed at the posterior end of the right branch. Three lobules at the extreme posterior end of the right branch appeared to be normal and secreting pancreatic juice through the posterior duct.

6. The spleen was of normal size, but there was a tumor on parietal surface of the dorsal extremity.

Microscopically, sections of the pancreas were largely fibro-necrotic tissue infiltrated with masses of variable size of large epithelial cells. The cells possessed a dark staining cytoplasm with the nuclei placed irregularly throughout the cytoplasm. There was no tendency to acini formation. Many of these tumor cell masses were undergoing necrosis in their central portion while proliferating at their peripheries. The normal lymphatic tissue of the lymph node was almost entirely displaced by the infiltrating proliferation of epithelial cells. A section of the duodenum made through the long axis of the pancreatic duct confirmed the explanation of the obstruction to the excretion of bile. Masses of the carcinoma were growing in the muscularus of the duodenum adjacent to the pancreatic duct.

PEDRO A. OLIVER

Santurce, Puerto Rico.

Intestinal Rupture in a Cow

A six-year-old Jersey cow came into the clinic with a history of previous treatment for colic, by a veterinarian. The animal showed symptoms of abdominal pain (kicking at its belly), absence of peristalsis and rumenation, absence of bowel evacuations, congested mucous membranes, a fast pulse and a temperature of 104° F.

A rectal examination confirmed a diagnosis of an intestinal obstruction. The hand could be inserted only six to eight inches into the rectum. A dark, reddish purple, mucilaginous catarrhal exudate was encountered in the bowel.

The animal was cast and an exploratory laparotomy was performed. Fecal material was encountered in the abdominal cavity, but no definite conclusion as to the cause of the obstruction was reached.

At a necropsy the following day a rupture was found in the posterior third of the ileum. There was a dark, fibrous, hemorrhagic infarct extending about six feet anterior to the rupture in the intestine. The wall was thickened by a serohemorrhagic infiltration; the lumen was filled with fluid and watery fecal material. The bowel posterior to the rupture had lost its muscle tone and was quite flabby. No fecal material was found in the intestine, posterior to the rupture, but the mucosa was covered with the catarrhal exudate previously mentioned. There was a small amount of serum and fecal material in the peritoneal cavity and a slight peritonitis. The posterior portion of the ruptured ileum showed some adhesions to underlying portions of the intestine.

Due to the absence of any fecal or other masses capable of causing an obstruction, the case was diagnosed as a torsion, which had completely cut off the circulation to a portion of the ileum, causing necrosis and subsequent rupture.

WALTER C. BOWIE

Kansas City, Kan.

Urethral Stricture in a Dog

A male English setter six years of age was presented for treatment for difficult urination accompanied by pain and a distended bladder. Bloody urine had been noticed several times in the preceding 30 days.

The urethra was examined by palpation over its course and by catheterization. Upon passing the catheter a short area of resistance was met at a distance of two inches anterior to the scrotum. After this stricture was passed urine flowed freely and the catheter passed in a normal manner through the remaining portion of the organ. The complete passing of the catheter helped differentiate this condition from urethral calculus.

The dog was placed in dorsal recumbency and the area anterior to the scrotum was prepared for operation by infiltration with a 2% procaine hydrochloride solution. A half inch incision was made in the median line just anterior to the scrotum. The incision was carried through the skin, subcutaneous fascia and the urethral muscles to the lumen of the urethra. The walls of the urethra were then sutured to the skin which created a permanent artificial opening for the passage of urine.

The dog was hospitalized for the following five days and was given five grains of methenamine three times a day. Also therapeutic doses of triple arsenates with sodium nucleate and vitamin B and iron tablets were given. The animal was exercised daily and placed on the usual boarding diet. He made an uneventful recovery.

Stricture of the urethra is a circumscribed narrowing of the lumen which interferes with the passing of urine. This narrowing of the lumen is due to the formation of cicatrical tissue and loss of elasticity as a result of injury to the mucous membrane of the urethra.

Stricture may be caused by tumors, operation, traumatic injury, urethritis or extreme

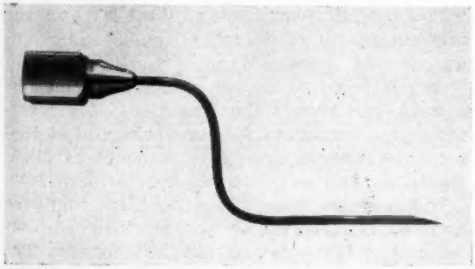
torsion of the urethra during copulation. This particular case was probably the result of trauma. Attempted cure of the stricture by repeated dilation of the narrowed portion of the urethra is long drawn out, time consuming and expensive and, in the end, usually fails to give permanent relief. The simple operation performed on this dog is common in steers and often employed in horses. It should be given more consideration in cases of stricture or blocking of the urethra in other animals.

MILO L. JOHNSEN

Topeka, Kan.

An Aid in the Technic of Intravenous Medication

Intravenous medication in large animals is often made difficult by the inability of the clinician to maintain his needle in correct position in the jugular vein during movements resulting from intractability or incoordination on the part of the animal being treated. The fact that some commonly used drugs, such as solutions of chloral hydrate and calcium chloride, may cause extensive tissue damage after perivascular delivery, adds to the desirability of maintaining correct placement of the needle at all times. It has been found by the author that the production of



two right angle turns in a 4-inch needle provides an instrument which if properly placed in the skin maintains a fairly well fixed position in the vein, even in horses which fall after the injection of chloral hydrate.

Insertion of the needle is made so that the terminal portion lies in the vein with its long axis parallel to that of the blood vessels. The central portion of the needle is then placed squarely through the original skin puncture.

The necessary bends are easily made after heating over a Bunsen flame, although some care must be taken to avoid overheating the needle point.

WILLIAM E. MADERIOUS,
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The Use of Penicillin in the Treatment of Bovine Actinomycosis

Several months ago a case report appeared in VETERINARY MEDICINE in which several hundred thousand units of penicillin was given to a beef cow with actinomycosis without noticeable benefit.

As every practitioner knows, the use of various forms of iodine does not always bring about a cure in the treatment of actinomycosis and it cannot be used in late pregnancy.

The writer has used penicillin in half a dozen cases of actinomycosis or actinobacillosis with good results.

The success of the treatment lies in the method of administration and a selection of cases. The animal is stanchioned. The area over the swelling is clipped and an antiseptic applied. A 14-gauge needle is pushed into the center of the swelling. If the center is fluid it is expelled through the needle. One hundred thousand units of penicillin mixed in 10cc of distilled water is injected into the center of the abscess. The area is thoroughly massaged and the animal turned out.

The swelling will go down and the skin will become loose over the swelling. This may take several weeks.

Since only a few cases have been treated in this manner, one cannot generalize; but it looks as if the treatment possesses some advantages over the older methods now in use.

G. W. BAYLES

Marion, Ill.

Use of Sulfanilamide in Gangrenous Mastitis

A cow, a Shorthorn-Jersey cross, was brought in for treatment of mastitis and frozen teats, the tips of which had been frozen during a sudden cold spell. By way of treatment the owner had inserted a milking tube in each of the four teats "to keep them open."

Gas gangrene had already developed in the udder when this cow was brought to the hospital. All four quarters were affected, but the right fore quarter was the most intensely inflamed. Generalized septicemia had already become established, together with marked depression, inappetence, absence of rumination, loss of weight and a temperature of 103.2° F. The whole udder was hot, tense, hard and painful. The teats were swollen at the ends and large scabs were developing over the meatuses. The ventral surface of the abdomen was edematous, crepitant and sensitive.

Treatment.—The first day 100,000 units of penicillin in physiological saline was given intramuscularly and one ounce of sulfanilamide (in a capsule) was given *per os*. The second

day the udder was milked out and two ounces of sulfanilamide was given *per os*. The milk removed from all four quarters of the udder was flaky and thin; that from the right front quarter being mixed with bloody serum.

Note swelling and discoloration of left quarters in this case of gangrenous mastitis

There was noticeable improvement in the cow's condition during the first two days of treatment. On this account, 55 grams of sodium sulfapyridine was given intravenously on the third day. Again the udder was milked out and 100,000 units of penicillin injected into each quarter. Because the animal had not drunk anything for four days, four gallons of warm water were given *via* the stomach tube.

There was a marked improvement on the fourth day. She was chewing her cud, eating some hay and grain and the rumen movements had started. One ounce of U. S. tonic[1] was given in three gallons of warm water to stimulate the appetite, and the sulfapyridine treatment was repeated. Hot packs were applied to the udder for an hour and a half.

On the next day, the fifth day of treatment, hot packs were applied to the udder for a two-hour period and all four quarters of the udder were milked out. The following day the udder was very definitely improved, except the right front quarter. The milk was normal from the other three. An injection of 100,000 units of penicillin was made into the right front quarter. The hot packs and the tonic were repeated.

On the seventh day the udder was milked out and hot packs applied again. Glyceride of tannic acid was massaged into each teat thoroughly. The right front quarter was beginning to show improvement. The following day the udder was milked out and a teat dilator introduced into each teat canal. The local treatment such as hot packs, massaging the teats with glyceride of tannic acid and milking out the udder was employed daily until the acute inflammation subsided. Recovery was uneventful after the septicemia was checked.

Outcome.—When the animal left the hospital, she was healthy and vigorous. Her udder was ruined for milk production and the owner was advised to fatten her for market.

ROBERT E. LINDERS

Baldwin, Ill.

[1] Solution of strychnine sulfate, 0.5% and arsenic trioxide 0.5%.

Malignant Carcinoma in the Dog

A puce, spayed, flat-coated Retriever, twelve years of age, and weighing about 65 pounds, was brought to the clinic in October, 1945, with a history of a gagging cough. The owner thought the patient might have swallowed a bone or other object which had lodged in her throat.

On examination, no obstructions could be found in the throat but valvular bruits were revealed. An X-ray photograph of the thorax showed an enlarged heart and the lungs apparently covered with small nodules, giving them a mottled appearance.

A diagnosis of malignant carcinoma of the lung was made. The patient was put on cough syrup, each dose of which contained 1½ minims of fluid extract of digitalis and two minims of fluid extract of belladonna. The owner was instructed to give this medicine three times a day for two weeks and then miss a week and repeat the treatment. The treatment was continued for six weeks and at that time the animal appeared to be in excellent condition and so continued for 15 months.

In December, 1946, after this bitch had been used to retrieve ducks one morning she developed a lameness in the left foreleg. The owner gave her five grains of aspirin three times a day for three days and the lameness disappeared. However, about two weeks later the lameness returned and gradually spread to the other legs also. The condition became more pronounced and the animal began losing weight and going down in condition.

January 7, 1947, she was returned to the clinic and after a thorough physical examination, euthanasia was advised.

On autopsy malignant growths were found on the lungs, liver, kidneys, spleen and pancreas. The kidneys also showed some indication of interstitial nephritis. There were also some adhesions of the bladder to the large intestine as well as some edema in the ventral part of the thorax.

The lungs, spleen, liver, and pancreas were sectioned in an attempt to locate the site of

the primary carcinoma. Because of the confused cytology it was impossible to determine the exact origin. Some of the cells seemed to be pancreatic in nature, but no definite conclusions could be drawn.

A second possibility was that the carcinomas might have originated in the lung. However, primary carcinomas of the lung are very rare in man and are even more of a rarity in animals.

Another rare phenomenon in this case was the discovery of carcinoma in the spleen. These tumors ranged in size from one-quarter to one inch in diameter and, although secondary, are never-the-less somewhat rare.

The interstitial nephritis was regarded as of little significance, since most dogs of the advanced aged of this one show some indications of nephritis.

ROBERT L. CORNELL

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The Streamlined Up-to-the-Minute Quackery

When we turn back a few pages of history and review some of the methods and therapy of the old time quacks, in human as well as animal diseases, we are amused by the absurdity of treatments, such as sulphur and molasses in the spring and fall for cleansing of the blood, bleeding for almost all ailments, and catnip, boneset and "nannyberry" tea for a multitude of ills of young people. Cutting a slit in old Bossy's tail and binding on salt pork to cure "wolf in the tail," boring a small hole in the old cow's horn for the cure of hollow-horn, mixing together bread dough, salt pork and fine cut tobacco to replace a lost cud.

However, it must be said for the doctors, healers, quacks or whatever they were called in those days, many of them were at least honest and sincere in their belief in their concoctions, which is more than can be said of our present day quacks, who are in the business for revenue only.

Not as much can be said for the better trained personnel of the present day, engaged in the manufacture and distribution of veterinary serums, vaccines, bacterins, udder infusions and other potent drugs, for both oral and hypodermic use, through the local drug trade to the farmer and livestock owner. Although these potent remedies should be used only by persons having an understanding of when and how to use them, the druggist with the full knowledge and consent of the manufacturer advises the purchaser that these remedies "are just what the veterinarian is using." No matter what ails the animal, the owner is told these products are good for it, provided, of course, he has the price to pay for the "remedy." The almighty dollar looms so big before the eyes of the manufacturer that the welfare and health of the animal is entirely lost sight of.

This unscrupulous method of handling these products is a far greater menace to the health of livestock than was the old time quack. One of these streamlined quacks is currently advertising prescriptions for nearly all curable diseases in livestock. Not many years back, he placed upon the market an abortion cure which sold like "hot cakes" until the Federal Government had it analyzed and this is what it contained: 98% water, 1% carbolic acid and the 1% foreign inert matter—dirt. If all his remedies contain as much virtue as his abortion remedy, and I know of no reason to suppose they are any better, it is easy to see what he is getting away with. Not only is the improper use of medicines a menace to the welfare of the livestock industry, but if this policy of doing business continues, it will deter students from entering the veterinary profession and that certainly will not help the livestock industry.

All hail the ethical manufacturers of livestock products who limit their sales to the veterinary profession. This method of selling is certainly not for the purpose of boosting their sales. I believe they have adopted this policy because they put the best they have into their products, are proud of them and want them used properly. They well know that the usefulness of their products depends upon the proper use of them for the specific conditions for which they are intended. And this of course depends upon an accurate diagnosis.

The welfare of the nation is closely bound to its livestock industry. Many of the diseases of animals may be transmitted to man, either by direct contact or by consuming contaminated meat or milk products. The veterinary profession is the guardian of the health of the nation's livestock and contributes materially to the happiness, health and prosperity of all the people who depend on wholesome food in adequate amount.

I am more than old enough to retire and unethical practices are not of personal moment to me. However, I am keenly interested in the future of the veterinary profession and in the welfare of the livestock industry and if my long period of observation and experience has taught me anything it is that the prevention and treatment of disease in our livestock needs and merits all of the skill we have available for the purpose.

B. ROYER

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Abstracts

Isolation of Unidentified Spirochete from Hen's Eggs

The observations reported by Steinhaus and Hughes[34] were made at the Rocky Mountain Laboratory near Hamilton, Mont., incidental to checking for the occurrence of disease in local flocks from which eggs were being obtained for laboratory use. This is the first known evidence of the occurrence of a spirochete in the tissues of hens in the United States. This is of concern to laboratory workers using chick embryos for culturing various pathogens or for manufacturing vaccines.

Army Food Inspection

The first purpose of Army Veterinary Corps inspection of food is to protect the health of the troops.[32] The second purpose is to determine whether the products meet all the terms of the contract under which they are purchased.

During the period, July, 1941, through December, 1945, the Quartermaster center system, operating under Field Headquarters, Perishable Subsistence Branch, Office of the Quartermaster General, Chicago, purchased over 13 billion, 420 million pounds of perishable foods of animal origin, valued at more than $3,359,000,000. Of this amount 24.12% was expended for beef and 12.84% for poultry and approximately 11% each for butter and eggs. The remainder was expended for lamb, mutton, pork, veal, bacon, ham, sausage, lard and lard substitutes, butter substitutes, cheese, ice cream, milk and sea foods.

Due to careful, repeated inspections made by Army Veterinary Corps officers throughout the United States, where these vast stores of very perishable foods were being procured, assembled, stored and issued, the losses encountered by property officers at Field Headquarters, during the peak of purchasing and storage activity, were less than five one-thousandth of one percent; one pound in 20,000 purchased and stored!

It is Army policy to procure only meats which have been inspected and passed on ante-mortem and post-mortem examination by veterinarians of the Bureau of Animal Industry, USDA. Under normal circumstances veterinary officers do little such inspection. However, the wide dispersion of our troops and other problems incident to the late war, made it necessary for veterinary officers to conduct such inspections. Complete statistics, especially for troops in combat zones are not available. However, it is known, that during the period 1942 to 1945, inclusive, over 700,000 animals (beeves, calves, hogs, sheep, lambs and game) received ante-mortem inspection and more than 600,000 received post-mortem inspection by veterinary officers. Of this number 67,000 were rejected for not being of proper type, class or grade and 20,000 were rejected for being insanitary or unsound. In addition post-mortem examinations were made of over 16,000,000 poultry, of which more than 10,000,000 received ante-mortem examinations also. More than 300,000 birds were rejected as being insanitary or unsound.

During 1942 and 1943, between 80 and 90% of all ante-mortem and post-mortem inspections made by the Army Veterinary Corps were in the China-Burma-India Theatre. During 1944 about 65% and during 1945 about 20% of the total, was in this theatre.

Foods of animal origin, procured by the Army under veterinary inspection, in peacetime reached a total of 153 million pounds in 1939. In 1942 it was three billion pounds; in 1944, six billion and in 1945 eight billion pounds. During the past seven years an average of 5.3% of all foods of animal origin, inspected by veterinary officers at time of procurement, was rejected. Converted to monetary terms, this amounts to a saving of more than 86 million dollars to the Government. Large as this sum may seem, it is insignificant when compared with the benefits derived from the maintenance of an adequate, safe and wholesome food supply for the Army.

As the war progressed, the Veterinary Corps was called upon, more and more, to perform food inspection for other government agencies. For example during 1945 more than one billion 250 million pounds were inspected for the Navy, Marine Corps, Coast Guard, War Shipping Administration, British Ministry of War Transport and lesser miscellaneous agencies. Of this amount more than a billion pounds was inspected for the Navy.

Foods of animal origin represent about 38% of the ration of our armed forces and about 60% of the cost of the ration. On the average, each man in the armed services consumes about five pounds of food per day, of which approximately two pounds are of animal origin. The latter foods were given at least two and usually many separate inspections; the number depending upon distances shipped and time in storage before delivery to the mess hall for consumption by troops.

[34] Steinhaus, E. A., and Hughes, L. E. Isolation of unidentified spirochete from hen's eggs after inoculation with liver tissue from hens. *U. S. Pub. Hlth. Repts.*, 62, p. 309. 1947. *Abst.* in *J. Am. Med. Ass'n.*

[32] Dildine, Seth C., Col. V. C. Army veterinary inspection of foods of animal origin. *The Military Surgeon*, 100:5, pp. 390-400. 1947.

Gangrenous Limbs Saved

A treatment for gangrene devised and reported[31] by physicians at the Veterans Administration Center, Los Angeles, makes use of a vitamin C and an amino acid, histidine. Injections of the two drugs are made hypodermically. The vitamin C converts the histidine into histamine which has a powerful dilating effect upon small blood vessels.

A Blood Coagulant

Penicillin as a blood coagulant has been reported by Macht[33] and others. The yellow amorphous penicillin has been found superior to the crystalline drug in its thromboplastic activity. However, the trend at present is toward a greater production of the crystalline penicillin and a lesser production of the amorphous type.

Trichinosis of Swine, Rats and Man

A survey[24] of rats in Toronto, Ontario, to determine the prevalence of trichinosis revealed infection in nine of 650 rats examined (1.4%). All nine infected rats were trapped at one time in one establishment where they had access to restaurant garbage.

"The Canadian law which prevents pigs from being fed on raw garbage has kept the incidence of trichinosis at a lower level than in the countries where such legislation has not been enforced. Cameron examined 2,995 hogs from different provinces in Canada and showed that 17, or 0.57%, were infected with *T. spiralis*. This incidence approximates that found in the United States in hogs fed on cooked garbage, or grain, or raised in fields without access to garbage or kitchen scraps. The incidence in hogs fed on uncooked garbage has been found to be 4.5 to 5%, and in those fed on slaughterhouse offal, 10 to 20%.

"The incidence of trichinosis in humans similarly is lower in Canada than in the United States. Nearly 12,000 autopsy cases examined in the United States showed that 16.2% were positive. Cameron examined 539 samples of human diaphragms from autopsies in Montreal, and demonstrated trichinosis in 1.5% of cases. The incidence approximated that found in adults in earlier surveys carried out in Toronto, namely 1.6%. Several isolated outbreaks and sporadic cases have occurred in Eastern Canada and the Maritime provinces, but these have been usually traced to individual sources.

"The role of the rat as a source of swine trichinosis has been a matter of much debate. More than 60 years ago Billings demonstrated that rats caught at a pork-packing house near Boston were all trichinous; those caught at stables where no hogs were kept showed an incidence of only 10%. He suggested, therefore, that the disease is transmitted from pigs to rats rather than from rats to pigs. Wright stressed the fact that if the rat were the primary source of infection the incidence should be almost as high in hogs fed on cooked as in those fed on raw garbage. The reported incidences are 1% and 4.5 to 5%, respectively. The source of infection for pigs fed on grain or raised in fields is still unknown. According to Dr. H. Roth in Denmark (private communication), there is an increasing opinion in Scandinavian countries that the fox might be of greater importance in the spread of trichinosis than the rat. There are no data on the incidence of trichinosis in foxes or other fur-bearing animals in Canada."

Heredity and the Mandible of the Dog

The orthodontic field has produced some contributions on hereditary dental conditions. Dewey said it was impossible to accept the idea of large teeth from one parent and small jaws from another; Angle dismissed it as absurd.

One of the most outstanding contributions in the field of animal biology was reported by Stockard[21] in 1941. Stockard, anatomist, geneticist, and cynophile, gathered together on an experimental farm in New York State thousands of dollars worth of pedigreed dogs, all registered with the American Kennel Club, and each one with unsullied ancestry. To work with him he invited physiologists, geneticists, histologists, and an orthodontist. When a thorough study of the purebreds was completed, the most diverse sorts of crosses were made, and the progeny of several generations were examined. Salukis were mated to dachshunds; massive St. Bernards were crossed with small lap dogs, and backcrosses of all these strange combinations were made. Certain abnormalities of dogs which are known to be inherited: the achondroplastic splay-legs of the dachshund and the basset hound, and the defective cranial base of bulldogs, were examined for Mendelian behavior.

In a great variety of ways it was clearly demonstrated that in crosses of extreme types

[31] *J. Am. Med. Ass'n*, Mar., 1947.
[33] Macht, D. I. *Science*, 105:313, Mar., 1947.
[24] Kruitunen-Ekbaum, E., and Webster, Dorothy. Trichinosis in wild rats in Toronto. *Canadian J. Pub. Hlth.*, 38:2, pp. 76-76. 1947.

[21] Stockard, Chas. R. The Genetic and Endocrine Basis for Difference in Form and Behavior, Philadelphia, 1941, Wistar Institute. Abst. by *H. J. Mostyn*, Dover, N. J.

of dogs, marked disharmonies could be produced. Excess amounts of skin tissue, and disproportionately large tongues were seen to occur, with marked crowding of teeth in a Great Dane-Pekingese cross.

Such manifestations of the operation of heredity led Stockard to these conclusions:

1. In size and form the cranium and face are independent.

2. There is a lack of correlation between the upper face and the mandible. A short palate does not necessarily signify a short mandible, nor a short mandible signify a short palate.

3. The size of the dental arch shows a greater fluctuation than does the size of the teeth. (Bony supporting structures seem to be modified more than teeth.) Where the snout is short, the teeth are too large for the jaw—crowding, rotation.

4. In these hybridization studies, it made no difference which parent was male or female. There appears to be no sex-linkage in the characters.

5. The majority of the characters of the bulldog skull are undoubtedly recessive in crosses with long-snouted dogs.

The bulldog has an inherited chondrodystrophy of the anterior cranial base, which prevents the normal forward growth of the upper face. Many of the uninitiated do not realize that the "grunts" and snoring of the bulldog, the pug and the Boston terrier are normal. It is fallacious to assume that treatment should be instituted for a condition that is merely due to a dentofacial anomaly.

Today there is a somewhat more sophisticated attitude on the part of the small animal practitioners, involving:

The realization that many of the things we seek to remedy are not pathologies, but merely individual variations not to our liking.

The realization that inheritance governs trivial things as well as gross conditions.

The realization that "congenital" and "inherited" are not synonymous terms.

Prevalence of Canine Leptospirosis

Of 101 dogs examined from the immediate neighborhood of Glasgow[23] (Scotland), the majority being house dogs, 52 (50%) gave positive serological reactions for leptospirosis, 40% having a higher titer for *L. canicola* and 6% for *L. icterohaemorrhagiae*. The greatest number of cases came from male animals and animals more than nine years of age. Clinical details were received in only a few cases, but of 11 animals in which nephritis symptoms were mentioned 10 were serologically positive for *L. canicola*. A high percentage of the sera from two greyhound kennels, in which acute enteritis was present was positive for *L. icterohaemorrhagiae;* this might be due to the prevalence of rats in such kennels.

It is suggested that a considerable percentage of chronic kidney disorders of older dogs originates with *L. canicola*.

[23] Stuart, R. D. Canine leptospirosis in Glasgow, *Vet. Rec.*, 58, pp. 131-132. 1946. Abst. in *Vet. Bul.*, 17:1, p. 15. 1947.

Transmission of Brucella Suis from Swine to Cattle

Brucella suis, all authorities agree, is far more infective for man than *Br. abortus*. Several outbreaks of human brucellosis, due to the consumption of raw milk, have been reported in which the porcine type of the organism was incriminated and a good many public health authorities regard the association of swine and dairy cows with serious apprehension.

Various investigators have reported the successful infection of cattle with *Br. suis* by artificial means, *i.e.* intravenous infection of massive doses of the organism or instillation of a large quantity of the organism into the conjunctival sac. Cows so infected recovered (lost their agglutination titer) rather promptly. With perhaps one or two exceptions all attempts to transmit brucellosis naturally from swine to cattle by association have resulted in failure or questionable success.

In an experiment at the Missouri station Elder[28] exposed cattle to pasture contact with artificially and naturally infected swine for a period of five years, without evidence of transmission of the disease from the swine to the cattle, other than low agglutination titers, in most instances of short duration. In addition to blood tests, samples of milk, fetal membranes, vaginal discharges and stomach contents of dead fetuses were cultured and inoculated intraperitoneally into male guinea pigs, without discovering an instance of transmission of *Br. suis* to the cows. Since the pasture was small (three acres) ample opportunity was afforded for close contact between the swine and the cattle.

The record of the experiment follows:

Summary

Eight cows were exposed to swine artificially infected with *Brucella suis* and kept in close contact with the hogs in a small pasture.

There was no evidence of spread of infection from the artificially infected swine to any of the cattle on experiment. All attempts to isolate Brucella organisms from the cattle were negative.

Evidence of elimination of infectious material from the artificially infected swine was proved by the fact that control negative gilts acquired the infection when running in the same pasture.

Cultures of *Brucella suis* were isolated from

[28] Elder, Cecil. Transmission of *Brucella suis* from swine to cattle under pasture conditions. Research Bul. 398, Univ. of Missouri Agr. Exp. Sta., Columbia.

both infected hogs and previously negative gilts which served as controls.

Three abortions in the cattle occurred while the experiment was in progress. One cow aborted her calf in 252 days. Another aborted after 258 days of the gestation period had elapsed. In the third, abortion occurred at the end of 157 days. In no case was it possible to isolate Brucella organisms from the aborted fetuses of the cows.

Several of the cows on experiment developed low blood agglutination titers and varied from negative to complete agglutination in dilutions of 1 to 60. There was no proof that these low titers were actually due to *Brucella suis*, but this possibility must be recognized even though we were unable to isolate Brucella organisms from any of the animals.

The data in this bulletin reports on 36 gestation periods with an average length of 278 days.

There was no evidence of any sterility or breeding difficulty and cases of retained placenta were not observed.

Previously negative swine when artificially inoculated gave evidence of becoming infected, as indicated by a blood agglutination titer of 1 to 100 or over, in an average of seven days. Our records showed this occurred in from 4 to 14 days in different individuals.

Swine recover much faster from *Brucella suis* infection than cattle do from *Brucella abortus*. If infection in swine is assumed when the blood titer is 1 to 50 or above, nineteen artificially infected swine on this experiment maintained such a titer for from 39 to 923 days. The average was 285 days, but it should be kept in mind that all but five of the hogs were sold while they still maintained a blood titer of 1 to 50 or higher.

Because *Brucella suis* has been isolated from cows' milk by other workers the possibility of contamination of the milk with this organism and the invasion of the cows udder must be recognized. There was no evidence that this occurred in this experiment when the cattle were exposed to artificially infected swine under pasture conditions.

Diet and Tuberculosis in Captive Wild Birds

Ratcliffe[30] shows that a change in the system of feeding at the Philadelphia Zoological Garden has been followed by a distinct decrease in the frequency of avian tuberculosis. With the exception of a mixed lot of birds in an indoor flight cage, the disease has been most common among groups of birds whose food had consisted chiefly of whole or cracked grains. In the new diet grain has been replaced by a mixed ration. This has improved the quality and quantity of protein, has increased elements of the vitamin B complex and has added vitamins A and D and iodized salt to the diets. In some groups the drop in tuberculosis could have resulted from decreases in the number of imported infections. In other groups, however, all evidence suggests that resistance has been increased by improved nutrition.

[30] Ratcliffe, H. L., Tuberculosis in captive wild birds: Decrease of its incidence following change in diets. *Am. Rev. Tuberculosis*, 54, p. 398. 1946. *Abst.* in *J. Am. Med. Ass'n.*

Book Reviews

Canine Distemper and the Diseases of the Distemper Complex. By *Leon F. Whitney*, D.V.M. 102 pages, with charts and tables. Published by Modern Publications, Inc., Worcester, Mass. 1947. Price $2.50.

This monograph is the first of a series planned by the publisher on the care and management of the various breeds of dogs. The present work is based upon articles by the author which were published in *Modern Dogs* two years ago. It is nontechnical and is intended for the information of dog owners.

Formerly an extensive breeder of dogs and more recently the manager of a large and unusually successful small animal clinic, in addition having engaged in research on these disease problems, the author is uniquely qualified to discuss the subject of canine distemper and "diseases of the distemper complex."

The subject is divided into distemper due to the virus of Carré, pneumonia, canine influenza, pharyngolaryngotracheitis (housedog disease), tonsillitis and coccidiosis. An appendix is included in which 120 different articles on the subject of canine distemper, distemper in species other than the dog and diseases presenting symptoms similar to those of distemper are summarized.

Much effort is made to dispel the popular belief "that every dog that sniffles has distemper." The prophylaxis of distemper is described in detail and persuasion both reasoned and emotional employed to induce all dog owners to have their dogs immunized against this fell destroyer. The author's confidence in present methods of distemper prophylaxis is unbounded; in specific treatment nil.

The work is written from the viewpoint of the clinician; statements are definite and unequivocal. While this is refreshing it will engender not a few arguments. For example, "Dogs immunized against Carré's distemper are immune to influenza." "Encephalitis is not a disease by itself." "No cure of distemper was ever made by penicillin or sulfonamides. If it got better as a result of such treatment, it wasn't Carré's distemper." The work presents considerable evidence of having been hurried; having more than the usual number of typographical errors and "slips," even for a first edition. Being as it is a record of the clinical observation of the author it is probably inevitable that the treatise in some places applies more to New England conditions than to the general experience. Thus many outside that area will not accord coccidiosis the importance it is given by the author. Still fewer will agree to the relative unimportance he assigns to encephalitis or to the very large measure of

success that attends the method of preventing distemper that he describes.

"Canine Distemper" is a book veterinarians can add to their waiting room reading material with confidence that it will help them to explain some of the vagaries of diseases of dogs and that it will conduce to better care of dogs by their owners.

Any book reviewed in these pages, or any other book if available, may be obtained by remitting the published price to VETERINARY MEDICINE, 7632 S. Crandon Ave., Chicago 49. Bulletins and Circulars should be requested direct from the address given in the notice. Generally they are supplied free unless a price is stated.

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Veterinary Bacteriology. By *Ivan Arthur Merchant,* D.V.M., Ph.D., C.P.H., Professor of Bacteriology and Head of the Department of Veterinary Hygiene, Division of Veterinary Medicine, Iowa State College. Third Edition, 683 pages, 137 illustrations. Published by Iowa State College Press, Ames, Ia. 1946. Price $7.00.

"Merchant's Bacteriology," having attained the distinction of three editions in six years is already well known and has received the accolade of approval. The objective and plan of this edition are the same as of the preceding editions. They cannot be better told than in the following quotation in the author's preface:

"Essentially this textbook, which is to serve as an introduction of bacteriology to students in veterinary medicine, emphasizes the general morphological and physiological characteristics of bacteria and is concerned primarily with the species of bacteria, yeasts, molds and filtrable viruses which are pathogenic to animals. An elementary introduction to the principles of infection and immunity also is included to establish a working basis for the study of pathogenic forms.

A complete description of a pathogenic organism embraces more than the morphology and physiology of the organism; consequently, this text includes the description of each organism as follows: synonyms and history, distribution and transmission, morphology and staining, culture requirements and characteristics, resistance, biochemical properties, antigenic structure and toxins, pathogenicity, immunity, and laboratory diagnosis."

Pathogenic protozoa sometimes discussed in texts on bacteriology are omitted from this one; nor are laboratory methods of milk and water analysis included.

Research in the field of bacteriology was limited during the war, but some contributions of that period have been included; others have been omitted. Thus there is an excellent section on antibiotics but, tetanus toxoid is not mentioned, nor is the present outbreak of avian pneumoencephalitis. Avianized rinderpest vaccine was probably revealed too late for this edition, but goat blood antirinderpest vaccine, which has preempted the field of rinderpest prophylaxis of recent years, also is omitted from the account of this disease. The method given for the production of crystal violet hog cholera vaccine and for the use of BTV is in neither case the one employed at present. These and a few other omissions may be described as "war casualties" due to shortages of paper, delays in printing and increased work piled upon faculty members because of absentees in the military service. On the other hand three organisms—*Proteus ammoniae, Hemophilus bovis* and *Clostridium sordellii* are added to the list of those described.

This work is well written and handsomely printed. It deserves a place in every veterinary library.

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Modern Development of Chemotherapy. —By *E. Havinga, H. W. Julius, H. Veldstra* and *K. C. Winkler.* Paper bound, 175 pages, many graphs and tables. Published by Elsevier Publishing Company, Inc., Amsterdam, London, New York. 1946. Price $3.50.

This is one of a series of monographs summarizing research which was continued intensively in Holland throughout the late war despite its burden of oppression, starvation and disorganization.

This work summarizes the investigations of the authors on the mechanism of action of the sulfonamide compounds and p-aminobenzoic acid; chemical investigations on the synthesis and activity of sulfonamide derivatives and of related compounds; pharmacological, immunological, and clinical investigations on sulfonamide compounds; as well as a brief chapter bearing upon investigations on antibiotic agents in mycotherapy, with special reference to expansine, an antibiotic substance, derived from *Penicillium expansum.* Expansine seems to be an analogue in plant pathology of penicillin in medicine; being toxic to mammals it is not suitable for internal use, but gives promise in the treatment of ringworm and other mycotic dermatoses when applied topically.

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Bulletins, Circulars, Reports, Etc.

Dairy Goats.—Folder No. D4808. The Ralston-Purina Co., St. Louis, Mo.

Poisonous Plants.—Illinois plants poisonous to livestock, 103 pages, 43 illustrations, four color plates. Circ. 599, University of Illinois, Extension Service, Urbana.

Blood Samples.—Collection of blood samples for the agglutination test in bovine infectious abortion, 8 pages, 10 illustrations. Circ. 348, University of Illinois. Extension Service. Urbana.